Hematidrosis: A Pathologic Process or Stigmata. A Case Report With Comprehensive Histopathologic and Immunoperoxidase Studies

Jane Manonukul, MD,* Wanees Wisuthsarewwong, MD,† Rattanavalai Chantanond, MD,† Akkrarash Vongirad, MD,* and Piyarat Omeapinyan, MD*

Abstract: Cases of hematidrosis (bloody sweat) are extremely rare. This disease has been described in various terms and has been often tied to religious belief as stigmatization. We report a typical patient with hematidrosis in a 14-year-old girl who frequently bled from her scalp and palms, and, occasionally, from trunk, soles, and legs. The bloody sweat from her scalp contained all blood elements. Immediate biopsy after there was bleeding on her scalp showed multiple blood-filled spaces that opened directly into the follicular canals or on to the skin surface. Immunoperoxidase studies failed to demonstrate vascular nature of these spaces. Our study explained how and why there was bleeding in our patient and in patients with related conditions as described in earlier literatures. We also explained why this phenomenon was intermittent because the spaces indicated above will disappear after exuding their content but then reoccurred after the blood flow was reestablished.

Key Words: blood-filled spaces, bloody sweat, hematidrosis, stigmata

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INTRODUCTION

Hematidrosis, the excretion of bloody sweat, is such an extremely rare phenomenon that very few sporadic patients of this condition are reported in the medical literature. Many reports were before the twentieth century at a time when the present sophisticated laboratory procedures were unavailable. The authenticity of most of these reports remains in question and has been widely discussed in the past, yet without any conclusions being made. The references termed as “hematidrosis” and related conditions, that is, stigmata (stigmatization), psychogenic purpura, vicarious menstruation, and epiphrosis cruenta, may be collected from the English literature (and one from Chinese literature). They were reviewed, and there was found to be no altogether satisfactory explanation because most of them were found to present only the clinical events, the authors’ ideas, which may, at best, be considered only their hypotheses. It has never been shown nor as yet any biopsy attempt been performed, to find out the reason or the cause of these bleedings, except the most recent report that described the vasculitis nature of this event (the Chinese report). We, herein, report a unique case of hematidrosis in a 14-year-old girl with recurrent bleeding episodes from palms, soles, scalp, and trunk. Histopathological examination and immunoperoxidase study and electron microscopic study of the biopsy specimen were carried out. As a result, we found multiple distinct, dermal-located, blood-filled spaces that opened directly on the skin surface or into the follicular canals. Our findings were thorough enough to explain the consecutive events of the bleedings. However, the cause of these spaces remains in question, and this is worthy of further discussion.

CASE REPORT

A 14-year-old girl had recurrent episodes of bloody sweat beginning 1.5 years ago. The parts of the skin implicated were palms, soles, scalp, arms, and legs, and, occasionally, her trunk, by noticing bloodstains on her clothes, but the palm was the most common site. These events had been exhausting her since that time and increased to such an extent that they became so frightening that she was shunned by her friends. With every bleeding episode, she was almost unaware of its onset, except that she sometimes felt soreness from these bleeding areas that enabled her to predict that within a few hours a bleeding event was going to commence. Her medical history was noncontributory. She had always been in excellent health and had never had a serious illness or underlying disease. Her schoolwork was low average. She took no medicines, aspirin, or vitamins.

She was hospitalized for a complete work-up and investigations. Her body skin, including the scalp, was otherwise unremarkable. There was no bleeding, ulcer, or scar. An extensive evaluation by means of quantitative blood chemistry, complete blood count, urine examination, chest x-ray, D-dimer test, erythrocyte sedimentary rate, and coagulograms were within the normal limit. The thick and thin films for malaria, antinuclear antibody showed negative results. She was in fair mental health, and her psychological evaluation by our psychiatrist was within normal limits. During hospitalization, she still had intermittent spontaneous bleedings on the sites previously described, especially on her palms and scalp (Figs. 1, 2). Upon close clinical observation, we sometimes noticed that there were bleedings via the hair follicles presenting as pin-sized bloody spots around the follicular orifices. The bloody sweat from her scalp contained red blood cells, white blood cells, and platelets (Fig. 3), which are

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compared with her complete blood count as shown in Table 1. Provocation tests to stimulate sweating by exercise stress test and hyperthermia induction from heat exposure modality resulted in profuse sweating that, however, was clear and colorless and was histologically confirmed as containing no blood elements. Because the bleedings frequently occurred on her left palm, a starch–iodine test was performed on her forearms and palms and showed similar results for both areas.

A biopsy of the scalp was done immediately after there was bleeding from this area and was carefully studied by routine hematoxylin–eosin and immunoperoxidase and electron microscopic studies. At first, the biopsy specimen showed focal collection of red blood cells in the follicular lumens near the orifices (Fig. 4), corresponding to the clinically found bleedings via the hair follicles noted by close observation. Afterward, step sectioning of the biopsy specimen was done. There were few inconspicuous loosening areas caused by separation of collagen fibers. These areas contained fibrin and red blood cells and were scattered in the dermis, especially near the hair follicles. By consecutive sections, they were observed as widening into large blood-filled spaces (Figs. 5A, B). We found some spaces opening directly onto the skin surface and also into the follicular canals via disrupted follicular epithelium (Figs. 6A, B). They contained no demonstrable endothelial cells, and it was confirmed by immunoperoxidase studies that they were not marked with factor VIII (Dako Cytomation, Carpinteria, CA) (Fig. 7), CD31 (Dako Cytomation), or CD34 (Dako Cytomation). All the eccrine and apocrine structures were unremarkable. Vasculitis was also absent. A subsequent electron microscopic study was also performed and showed no ultrastructural change within all these appendages as did the capillaries. There was no appropriate treatment to reduce or to clear her bleeding symptoms. She still had recurrent bleedings during hospitalization. A trial 2-month prescription of lorazepam, a minor tranquilizer, was given for reducing her anxiety state, and the result was surprisingly excellent because her bleeding disappeared. There has been, to our knowledge, no bleeding since that time.

**DISCUSSION**

Hematidrosis or “bloody sweat,” is extremely rare, and very few patients were reported in the past. Our review of these previous reports showed no satisfactory results. Its pathogenesis is unclear and sometimes supposed to be mysterious in nature and was often bound to the religious belief as stigmatisation. It was our fortune to find this rare condition and to have the opportunity to explore this event. This condition has usually been classified by its causes into the following: (1) a component of systemic diseases; (2) vicarious menstruation; (3) excessive exertion; (4) psychogenic; and (5) unknown causes. The psychogenic cause was found to occur in an acute emotional period, for example, fear of death, during stressful excitement or hypnosis. Stigma, a Greek word, is sometimes imbued with mysticism. It formerly meant a spot, a sign, a wound, or a mark branded on a slave. From the time of early writings about Christ’s Crucifixion, this term took on a special meaning as the reproduction of the wounds on palms, soles,
and crown that Christ suffered on the cross. It was also divided into religious and nonreligious causes with the former believed to be supernaturally imposed by God. Jacobi (1923), quoted by Klauder, reported that there were 300 recorded instances of stigma (stigmata). The authenticity of many of those reports remained in question because some patients were believed to be self-inflicted. Hyde described a patient who had bleedings on body regions that could be accessed by his own hands. Most of the stigmata patients were females, white, and Catholics; however, religions other than Catholics were also found to recognize stigmata. Although our patient frequently had bleedings from the sites typical of the Crucifixion, this type of stigmatization was not relevant in her case because of the difference in race and religion and the fact that she had no knowledge of stigmata.

Another type of bleeding through this skin is psychogenic stigmata. This term is used to signify areas of scars,

TABLE 1. Comparison Between Blood and Bloody Sweat

<table>
<thead>
<tr>
<th>Sample</th>
<th>Date</th>
<th>Sweat First</th>
<th>Sweat Second</th>
<th>Blood First</th>
<th>Blood Second</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>September 19, 2005</td>
<td>0.0</td>
<td>1.2</td>
<td>11.3</td>
<td>10.9</td>
<td>12–18 g/dL</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>September 19, 2005</td>
<td>0.7</td>
<td>1.9</td>
<td>37</td>
<td>34.9</td>
<td>37%–58%</td>
</tr>
<tr>
<td>Red blood cells</td>
<td>September 19, 2005</td>
<td>0.1</td>
<td>0.38</td>
<td>—</td>
<td>5.41</td>
<td>4.2–5.4 × 10^6/µL</td>
</tr>
<tr>
<td>MCV</td>
<td>September 19, 2005</td>
<td>74</td>
<td>49.9</td>
<td>66.5</td>
<td>64.5</td>
<td>53.3 fl</td>
</tr>
<tr>
<td>MCH</td>
<td>September 19, 2005</td>
<td>0.0</td>
<td>30.5</td>
<td>20.3</td>
<td>20.1</td>
<td>26–32 pg</td>
</tr>
<tr>
<td>MCHC</td>
<td>September 19, 2005</td>
<td>0.0</td>
<td>61</td>
<td>30.5</td>
<td>31.2</td>
<td>31.35 g/dL</td>
</tr>
<tr>
<td>White blood cells</td>
<td>September 19, 2005</td>
<td>4.8</td>
<td>2.0</td>
<td>6.6</td>
<td>7.31</td>
<td>4–11 × 10^7/µL</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>September 19, 2005</td>
<td>25.8</td>
<td>77.7</td>
<td>62.4</td>
<td>74.0</td>
<td>50%–80%</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>September 19, 2005</td>
<td>49.9</td>
<td>8.4</td>
<td>24.4</td>
<td>20.7</td>
<td>25%–50%</td>
</tr>
<tr>
<td>Monocytes</td>
<td>September 19, 2005</td>
<td>2.9</td>
<td>7.6</td>
<td>11</td>
<td>3.8</td>
<td>2%–10%</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>September 19, 2005</td>
<td>7.3</td>
<td>6.3</td>
<td>2.1</td>
<td>1.4</td>
<td>0%–5%</td>
</tr>
<tr>
<td>Basophils</td>
<td>September 19, 2005</td>
<td>14.1</td>
<td>0</td>
<td>0.2</td>
<td>0.1</td>
<td>0%–2%</td>
</tr>
</tbody>
</table>

MCH, mean corpuscular hemoglobin; MCV, mean corpuscular volume; MCHC, mean corpuscular hemoglobin concentration.

FIGURE 4. Presence of red cells collection at follicular openings (original magnification ×4).

FIGURE 5. A, a small blood-filling space and B, showed gradually enlargement (original magnification ×10).
localized pain, open wounds, or bleedings through the unbroken skin. There was a report of frequent neurosis in patients belonging to this group. T. N. in Germany, cited by many reports, was a very representative patient of this type. The clinical findings of this type were stereotypical, including a slight elevation of skin before prolonged oozing of blood and a pea-sized bluish discoloration on patient’s palm. Erysipelas-like lesion was also noted in each patient. Copeland reported a patient who developed bleedings from her old scars whenever she had serious anxiety. Psychogenic purpura was another cause of cutaneous bleedings. It was supposed to be caused by hypersensitivity to the patients’ own blood or autoerythrocyte sensitization and was characterized by repeated outcrops of ecchymoses, gastrointestinal bleedings, and hematuria. Of the 27 patients reported by Ratnoff and Agle, bleedings through the skin were noted in 3 patients. Emotional problems such as hysterical mechanisms and psychosomatic disorders were believed to induce bleedings too.

Other causes of hematidrosis had also been described as vicarious menstruation, that is, periodic extragenital bleedings on face, arms, chest, and axilla as due to excessive physical exertion and as a malarial systemic disease.

Our review of these previous literatures did not help us understand this event. We, herein, reported a 14-year-old Thai girl presenting the typical features of hematidrosis. Immediate biopsy on the scalp showed multiple blood-filled spaces, of microscopic size, that were scattered within the dermis. After step section, some spaces opened directly into the follicular lumens or directly onto the skin surface. Our findings clearly showed us the route of the bleedings in our patient. However, as its name implies, we could not demonstrate any relationships between these spaces and the sweat apparatus even after complete serial sectioning of the whole biopsy specimen. Both the sweat glands and ducts showed no connection to these

**FIGURE 6.** A, The space opened directly on the skin surface (original magnification ×10) and B, into hair follicles (original magnification ×4).

**FIGURE 7.** This space showed negative immunostaining of factor VIII. The staining pattern was similar with CD31 and CD34.

**FIGURE 8.** Nearby eccrine gland showed normal ultrastructural findings (original magnification ×3300).
spaces. By electron microscopic study, the eccrine and other appendages showed remarkable findings. At this moment, whether these spaces were vascular seemed worth considering. Through hematoxylin–eosin staining, there was noted an absence of endothelial cells. Immunoperoxidase studies for endothelial cells such as factor VIII, CD31, and CD34 showed negative results; these findings did not support the evidence of vascular nature of these spaces. The study from China cited the vasculitis nature of this condition because it noted occlusion of capillaries. However, we could not find any evidence of vasculitis in our study.

Some believe that this disease was self-inflicted. We also considered this possibility. Our patient was under intensive nursing care and under close observation by our physicians to obtain an immediate biopsy right after any bleeding episode. Sometimes the bleeding awakened her from her sleep, and therefore, we concluded that she was unable to inflict the bleeding herself. From our microscopic findings, there was found to be an absence of tract-like structures containing fibrin as are usually found in penetrating wounds, absence of inflammatory cells, on the presence of multifocal blood-filled spaces that were located either in the upper dermis or deeper in the lower dermis. These findings were not compatible with self-induction. We believed the bleedings in our patient to be a true pathologic process. The term “hematidrosis” was used to describe sweat containing blood as found in this patient. In fact, we strongly disagreed with this term because we did not find any relationship between these spaces and sweat apparatus. However, we could not determine an appropriate term for this condition. It could be named “hematofolliculohidrosis” because it appeared along with sweat-like fluid, and the blood exuded via the follicular canals.

The choice of a more appropriate term should be discussed further when more information becomes available.

Because of lack of evidence of the vascular nature of these spaces, we could not explain the exact mechanism(s) that produces this event. There may be defects in the dermis causing stromal weakness. These defects will communicate with vascular spaces somewhere in the dermis, and they will eventually dilate and enlarge as blood-filled spaces when the blood enters. After that, these spaces will exude the blood either via follicular canals or directly onto the skin surface; this will occur whenever the positive pressure inside is strong enough (Figs. 4A, B). Afterward, they will collapse and leave no scar. This phenomenon, which acts like a balloon, will wax and wane and thus explain why these bleedings are sometimes intermittent and self-limiting. It will not recur when it is strong enough (probably from fibrosis, etc.) that the blood could not enter. In our opinion, immediate biopsy is important because a late biopsy, after these spaces collapsed, will be unable to identify them, as in the study of Zhang et al. when the biopsy was performed 12 h later. Finally, although this condition is extremely rare, it is necessary to have another new eruptive case to conduct further studies. Immediate biopsy, right after bleeding, to determine the correct findings, is necessary and is recommended.

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REFERENCES