

Allergic contact dermatitis by *Artemisia*: Report of two cases

Panqian Wu  | Yunting He | Zixun Zeng | Zhi Yang | Yuye Li

Department of Dermatology, First Affiliated Hospital, Kunming Medical University, Kunming, China

Correspondence

Yuye Li, Department of Dermatology, First Affiliated Hospital, Kunming Medical University, No. 295, Xichang Road, Kunming, 650032, China.
Email: yyeli2000@126.com

KEYWORDS: allergic contact dermatitis, *Artemisia*, *Artemisia indica* Willdenow, *Artemisia lavandulifolia* Candolle

We report two cases of allergic contact dermatitis caused by *Artemisia* plant, confirmed by patch testing and plant identification by botanists. *Artemisia indica* Willdenow and *Artemisia lavandulifolia* Candolle, widely used as traditional herbs in Southeast China, are likely to be contact allergens.

CASE REPORTS

Case 1. A 45-year-old woman presented with a 1-month history of erythema and vesicles on her abdomen (Figure S2A in File S1) and occasional erythema on her upper limbs. One month ago, she, as well as her mother-in-law and friends, applied dressings containing *Artemisia* plant juice on their abdominal skin to treat abdominal cramps, guided by a local Tibetan doctor in Shangri-La, Yunnan province, southwest of China. The patient developed pruritic erythema on her abdomen within 10 minutes. Dressings were immediately removed. She later developed vesicles with clear liquid, erosion, and exudation on her abdomen. Her mother-in-law (Case 2) developed similar rashes 1 day later, while none of her friends were affected. The patient reported previous topical exposure to *Artemisia* for therapeutic use, but no skin reaction at that time. She was treated with a topical glucocorticoid and systemic antihistamines for almost 1 month at a local hospital without significant improvement but developed new sporadic erythema with pruritus on the upper limbs and trunk.

Then she came to our hospital and patch testing was performed with mashed fresh *Artemisia* plants she provided (which were identified as *A. indica* Willdenow and *A. lavandulifolia* Candolle by a botanist; Figure S3 in File S1). The patch test showed an extreme positive reaction to *A. indica* Willdenow and positive reaction to *A. lavandulifolia* Candolle (Figure S1A in File S1). Biopsy of erythema on her abdomen showed a lichenoid reaction with liquefaction degeneration of basal cells (Figure S4A in File S1). The eosinophils count and immunoglobulin E (IgE) were normal as were other laboratory examinations. She

was then treated with oral methylprednisolone (24 mg/6 d, 12 mg/4 d), topical halometasone, and zinc dioxide cream. Seven days after her admission, the rashes on her abdomen and upper limb faded, and the pruritus was significantly relieved. No recurrence was found on follow-up at 6 months.

Case 2. A 76-year-old woman, mother-in-law of the aforementioned patient, developed erythema and vesicles on her abdomen (Figure S2B in File S1) 1 month ago, and then milder erosions and exudation 1 day after contacting dressings containing the same *Artemisia* ingredient. She was also treated with local corticosteroids at a local hospital without improvement. Afterwards, she gradually developed erythema on the knees with pruritus. She then consulted our hospital with the aforesaid patient. Patching test showed a strong positive reaction to *A. indica* Willdenow and a positive reaction to *A. lavandulifolia* Candolle (Figure S1B in File S1). Skin biopsy of erythema on her abdomen showed degeneration of basal cells with infiltration of lymphocytes (Figure S4B in File S1). She had elevated serum total IgE level (636 IU/mL) and normal eosinophil counts. After the treatment with desloratadine citrate disodium (8.8 mg/d), cyproheptadine (2 mg/d), desonide cream, and zinc dioxide cream, the rashes significantly improved within 7 days. The patient denied previous exposure to the plants or previous allergic conditions. There were no recurrences after a 6-month follow-up.

DISCUSSION

Plants are widely used as traditional herb by local people in Southeast China, especially in Shangri-La regions. In traditional Chinese medicine (TCM), *Artemisia* is used as an anti-inflammatory application,¹ even in skin inflammation.² Until now, *Artemisia*-related skin allergy is rarely reported. However, we identified two patients with *Artemisia*-related allergic contact dermatitis confirmed by patch tests.

Artemisia belongs to the Compositae family. There are about 300 different species of *Artemisia* plants, most of which are distributed in the alpine temperate zones of North America, Asia, and Europe.³ *A. indica* Willdenow and *A. lavandulifolia* Candolle are two

Panqian Wu and Yunting He are co-first authors.

species of *Artemisia* plants, both called *Artemisia* in TCM, used for providing pain relief, as astringent, and for their antipruritus, plague relief, among other effects.^{4,5}

Although rarely reported as causing allergic contact dermatitis, *Artemisia* was reported to cause respiratory allergies and food allergies time and again.^{6,7} Reports found that *Artemisia* pollen-induced allergic rhinitis and asthma were associated with human leukocyte antigen class II genotype.^{8,9} Lipid transfer proteins in *Artemisia* plant were reported as major allergens causing related food allergy in China.⁶ Sesquiterpene lactone compounds are found in *Artemisia*.¹ Studies showed that sesquiterpene lactone compounds were strong sensitizers and used in standard patch testing kit.¹⁰ Although our two patients had confirmed *Artemisia* contact allergy, patch test of Sesquiterpene lactone mix 0.1% pet. in a standard kit showed negative result, suggesting potentially unknown allergens. In addition, our two patients presented with a lichenoid reaction, which is a relatively rare form in allergic contact dermatitis, suggesting a scaled-down type IV allergic reaction of lichen planus type.¹¹ Hence, we suggest that there might exist undefined allergens in *Artemisia* related to the rare form of contact dermatitis. Furthermore, the plant samples our patients used may not only be a strong contact allergen, but also an capable of causing irritant reactions.

ACKNOWLEDGEMENTS

We thank Kunming Institute of Botany, Chinese Academy of Sciences for offering the results of plant identification.

CONFLICTS OF INTEREST

None to declare.

ORCID

Panqian Wu  <https://orcid.org/0000-0001-6152-2441>

REFERENCES

1. Ahuja A, Yi YS, Kim MY, Cho JY. Ethnopharmacological properties of *Artemisia asiatica*: a comprehensive review. *J Ethnopharmacol*. 2018; 220:117–128. <https://doi.org/10.1016/j.jep.2018.03.032>.

2. Kwon OS, Choi JS, Islam MN, Kim YS, Kim HP. Inhibition of 5-lipoxygenase and skin inflammation by the aerial parts of *Artemisia capillaris* and its constituents. *Arch Pharm Res*. 2011;34(9):1561–1569.
3. Ahmad W, Khan I, Khan MA, Ahmad M, Subhan F, Karim N. Evaluation of antidiabetic and antihyperlipidemic activity of *Artemisia indica* linn (aerial parts) in Streptozotocin induced diabetic rats. *J Ethnopharmacol*. 2014;151(1):618–623.
4. Rashid S, Rather MA, Shah WA, Bhat BA. Chemical composition, antimicrobial, cytotoxic and antioxidant activities of the essential oil of *Artemisia indica* Willd. *Food Chem*. 2013;138(1):693–700.
5. Cha J-D, Kim Y-H, Kim J-Y. Essential oil and 1,8-cineole from *Artemisia lavandulaefolia* induces apoptosis in KB cells via mitochondrial stress and caspase activation. *Food Sci Biotechnol*. 2010;19(1):185–191.
6. Oteros J, Bartusel E, Alessandrini F, et al. *Artemisia* pollen is the main vector for airborne endotoxin. *J Allergy Clin Immunol*. 2019;143(1):369–377.e5.
7. Deng S, Yin J. Mugwort pollen-related food allergy: lipid transfer protein sensitization and correlation with the severity of allergic reactions in a Chinese population. *Allergy Asthma Immunol Res*. 2019;11(1):116–128.
8. Wang M, Xing Z-M, Yu D-L, Yan Z, Yu L-S. Association between HLA class II locus and the susceptibility to *artemisia* pollen-induced allergic rhinitis in Chinese population. *Otolaryngol Head Neck Surg*. 2016;130(2):192–196.
9. Torío A, Sánchez-Guerrero I, Muro M, et al. HLA class II genotypic frequencies in atopic asthma. *Hum Immunol*. 2003;64(8):811–815.
10. Bauer A, Geier J, Schreiber S, Schubert S. Contact sensitization to plants of the Compositae family: data of the Information Network of Departments of Dermatology (IVDK) from 2007 to 2016. *Contact Dermatitis*. 2019;80(4):222–227.
11. Nakayama H. Pigmented contact dermatitis and chemical depigmentation. In: Johansen J, Frosch P, Lepoittevin JP, eds. *Contact Dermatitis*. 3th ed. Berlin, Heidelberg, Germany: Springer; 2001.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Wu P, He Y, Zeng Z, Yang Z, Li Y. Allergic contact dermatitis by *Artemisia*: Report of two cases. *Contact Dermatitis*. 2020;1–2. <https://doi.org/10.1111/cod.13495>

MATERIALS AND METHODS

Patch testing was performed with the Chinese baseline series, which includes sesquiterpene lactone mix 0.1% pet. (alantolactone 0.033%, dehydrocostus lactone 0.033%, costunolide 0.033%). The plants provided by patient 1, locally called “Artemisia plants”, were confirmed to be *Artemisia indica* Willdenow and *Artemisia lavandulifolia* Candolle by botanists from Kunming Institute of Botany (Figure 3). Patch testing was performed with 0.9% normal saline (Figure A&B I-1), ethanol (75%) (Figure A&B I-2), petrolatum (Figure A&B I-3), the juice of mashed fresh *A. indica* Willdenow alone (Figure A&B I-4) and juice of mashed fresh *A. lavandulifolia* Candolle alone (Figure A&B I-5). We used the juice of mashed fresh plants of *A. indica* Willdenow with ethanol 1:1 (pet) and 1:2 (pet) (Figure A&B II-1 and II-4), with normal saline (0.9%NS) 1:1 (pet.) and 1:2 (pet.) (Figure A&B II-2 and II-5), with petrolatum 1:1 and 1:2 (Figure A&B II-3 and II-6). And we also prepared the patching test of *A. lavandulifolia* Candolle in same way: juice of mashed fresh plants of *A. lavandulifolia* Candolle with ethanol 1:1 (pet.) and 1:2 (pet.) (Figure A&B III-1 and III-4), with normal saline (0.9% NS) 1:1 (pet.) and 1:2 (pet.) (Figure A&B III-2 and III-5), with petrolatum 1:1 and 1:2 (Figure A&B III-3 and III-6). Allergens were tested using IQ-Ultra chambers (Chemotechnique Diagnostics, Vellinge, Sweden) applied on the back.

PATCH TESTING RESULTS

The results was read on day (D)2, D3 and D7 according to ESCD criteria¹. The results of patch testing are presenting by three tables below (Table1-3). The patch test showed a strong positive reaction to *A. indica* Willdenow (Figure1 A-II) and a positive reaction to *A. lavandulifolia* Candolle (Figure1 A-III) in patient 1, and strong positive reaction to *Artemisia indica* Willdenow (Figure1 B-II) and positive reaction to *A. lavandulifolia* Candolle (Figure1 B-III) in patient 2. We further did the same patch test of *A. indica* Willd enow and *A. lavandulifolia* Candolle on 5 healthy persons in same way as in the patients, all showing negative results.

Table1 Blank control

Patch test		Results	
		Patient 1	Patient 2
normal saline(0.9%NS) (1)		-	-
Ethanol (2)		-	-
Vaseline (3)		-	-
<i>Artemisia indica</i> Willd. (4)		++	++
<i>Artemisia lavandulaefolia</i> (5)		+	+

Table2 *Artemisia indica* Willd patch testing

Patch test		Results	
		Patient 1	Patient 2
<i>Artemisia indica</i> Willd mix	1:1(1)	++	++
0.9%NS	1:2(4)	++	++
<i>Artemisia indica</i> Willd mix	1:1(2)	++	++
ethanol	1:2(5)	++	++
<i>Artemisia indica</i> Willd mix	1:1(3)	++	++
vaseline	1:2(6)	++	++

Table3 *Artemisia lavandulaefolia* patch testing

Patch test		Results	
		Patient 1	Patient 2
<i>Artemisia lavandulaefolia</i> mix	1:1(1)	+	++
0.9%NS	1:2(4)	+	+

<i>Artemisia lavandulaefolia</i> mix	1:1(2)	+	+
ethanol	1:2(5)	++	+
<i>Artemisia lavandulaefolia</i> mix	1:1(3)	-	++
vaseline	1:2(6)	?+	+

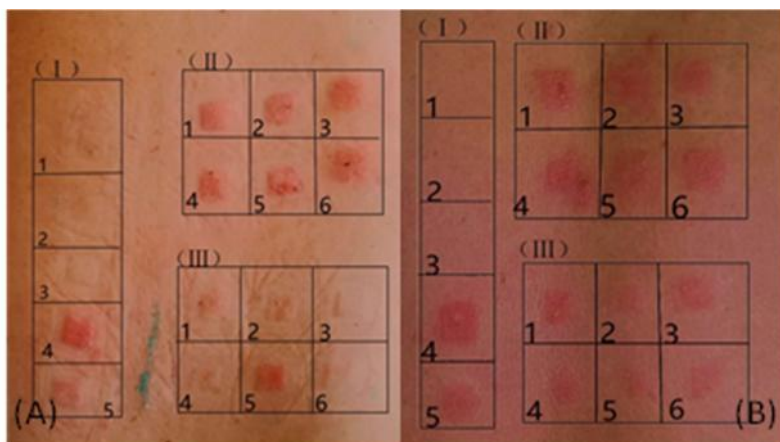


FIGURE1 (A),Patch testing in patient 1 showed erythema, with strong positive reaction to *Artemisia indica* Willdenow and a positive reaction to *Artemisia lavandulifolia* Candolle; **(B)**, Patch testing in patient 2 showed erythema, with strong positive reaction to *Artemisia indica* Willdenow and positive reaction to *Artemisia lavandulifolia* Candolle (applied for 48 hours, read on D2 and D 7).



FIGURE2 (A),Erythema, vesicles, erosion and scar on the abdomen in case 1.**(B)** ,Erythema ,vesicles , erosion and scar on the abdomen in case 2.



FIGURE3 (A), *Artemisia indica* Willdenow, (B), *Artemisia lavandulifolia* Candolle.

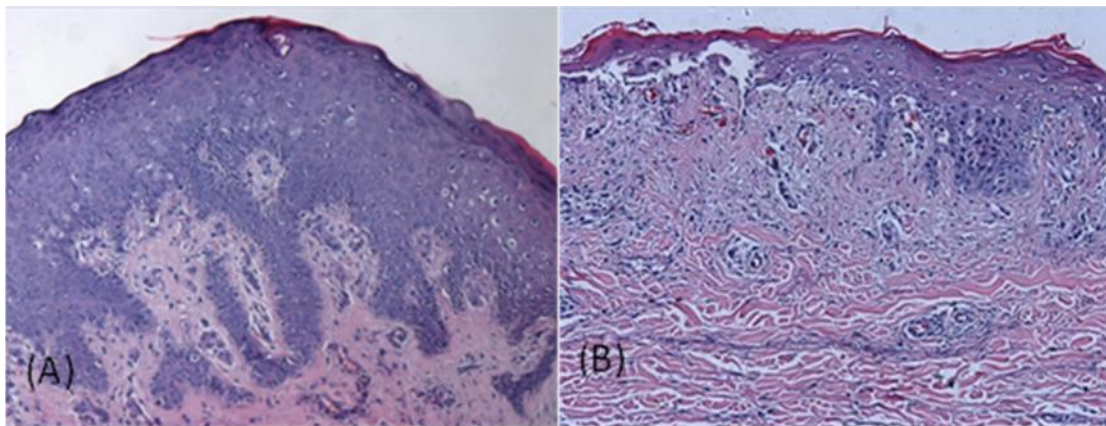


FIGURE 4 (A), histology patient 1, (B), histology patient 2.