

LETTER TO THE EDITOR

Mucosal angioedema involving the oropharynx signals severe cold urticaria: COLD-CE study insights

Dear Editor,

Cold urticaria manifests with a wide range of reaction severity, from localized wheals and cutaneous angioedema to cardiovascular, respiratory and gastrointestinal symptoms.^{1,2} Interestingly, not all individuals react to the ingestion of cold food or drinks.^{3,4} This clinical variability remains poorly understood, highlighting the need for better phenotyping in ColdU.

Typical ColdU (ColdU^T) is diagnosed by whealing within 10 min on skin exposed to a melting ice cube or the TempTest® device (either version 4.0 [TT4] with a 4–44°C gradient, or the older version 3.0 [TT3] with 12 fixed 4–26°C probes). The critical stimulation time threshold (CSTT) and critical temperature threshold (CTT) indicate the shortest exposure time and highest temperature needed to elicit a wheal.⁵ These parameters vary substantially among patients,^{5,6} and their associations are not yet fully understood. Magerl et al. reported a correlation between CTTs obtained via TT4 and TT3.⁷

This analysis expands on our previous COLD-CE study report,⁵ which identified oropharyngeal and laryngeal symptoms as risk factors for systemic reactions. In the present analysis, we define these symptoms as mucosal angioedema involving the oropharynx (MAO), characterized by a sensation of swelling of the tongue, pharynx or larynx and examine this phenotype in depth. A total of 535 patients with ColdU^T were recruited from 2019 to 2025, including 123 additional patients enrolled after the first phase of the study. All underwent cold stimulation testing (CST) with an ice cube and/or TempTest®. Patients receiving omalizumab ($n=55$) at enrolment were included based on CST results obtained prior to treatment, and only their clinical histories were analyzed.

Statistical analyses were performed using IBM SPSS V25.0, with a significance level set at $p < 0.05$. Numerical variables were non-normally distributed and expressed as medians and interquartile ranges (IQR), while categorical variables were presented as counts and percentages. The Mann–Whitney and Fisher's exact tests were used for continuous and categorical variables, respectively. Correlations were assessed with Spearman's rho (r), interpreted as weak (0.10–0.29), moderate (0.30–0.50) or strong (>0.50).⁸

MAO triggered by ingestion of cold food or drinks was reported by 32.1% of patients and was significantly associated

with generalized wheals ($p < 0.001$), cutaneous angioedema ($p < 0.001$) and systemic symptoms (cardiovascular: $p < 0.001$; respiratory: $p < 0.001$; gastrointestinal: $p = 0.001$). MAO was also linked to a higher number of relevant cold triggers ($p < 0.001$), including weaker stimuli like localized contact with cold liquids or surfaces (both $p < 0.001$). Moreover, MAO patients had shorter CSTTs and higher CTTs measured with TT4 (both $p < 0.001$), and reported greater quality-of-life impairment per the Dermatology Life Quality Index (DLQI)⁹ (Table 1).

To our knowledge, this is the first demonstration that shorter CSTTs correlate with higher CTTs and larger wheal diameters, suggesting that patients who react quickly may also do so at higher temperatures and with more pronounced skin responses (Table 2). Among patients with results from both the ice cube and TempTest® ($n = 318$), 80.8% tested positive on both, 2.5% only on the TempTest® and 16.7% only on the ice cube test. This suggests that the ice cube test may detect lower-temperature reactivity or responses not strictly temperature-dependent. Unlike the variable-sized ice cube, the TT4 has a standardized 2 mm probe width, which allows for consistent wheal size assessment and additional insight into cold sensitivity.

These findings highlight MAO as a clinically relevant, high-risk feature within ColdU^T. We recommend routine assessment of MAO in ColdU^T patients to guide management, including patient education on preventive measures and the prescription of adrenaline autoinjectors.¹⁰ Additionally, we suggest its inclusion in future disease severity scoring systems.

KEYWORDS

anaphylaxis, angioedema, cold urticaria, skin tests, urticaria

ACKNOWLEDGEMENTS

This manuscript benefited from the support of the GA²LEN UCARE network (<https://ucare-network.com>). We dedicate this manuscript to the memory of our dear friend and leader, Marcus Maurer.

FUNDING INFORMATION

This research was supported by the Slovenian Research and Innovation Agency, grant number P3-0360.

TABLE 1 Clinical features of patients with and without mucosal angioedema involving the oropharynx (MAO).

	Total, <i>n</i> = 535	MAO		<i>p</i> -value
		Yes, <i>n</i> = 172 (32.1)	No, <i>n</i> = 363 (67.9)	
Demographics and general characteristics				
Age (years)	36.0 (26.0–49.0)	37.0 (26.3–48.0)	36.0 (26.0–49.0)	0.298
Age ≥18 years	496 (92.7)	168 (97.7)	328 (90.4)	0.002^a
Female gender	369 (69.0)	126 (73.3)	243 (66.9)	0.161
BMI	24.4 (21.8–27.8)	24.9 (22.1–28.7)	24.2 (21.6–27.4)	0.066
Age at ColdU onset (years)	29.0 (18.0–42.0)	30.0 (20.0–43.0)	29.0 (18.0–42.0)	0.426
Paediatric onset of ColdU	119 (22.2)	34 (19.8)	85 (23.4)	0.374
Disease duration (months)	48.0 (16.0–108.0)	48.0 (24.0–120.0)	42.0 (14.0–96.0)	0.229
Positive family history of ColdU	27 (5.0)	11 (6.4)	16 (4.4)	0.397
Country with air temp. recorded below 0°C	402 (75.1)	121 (70.3)	281 (77.4)	0.087
Types of CRs				
Wheals (localized or generalized)	518 (96.8)	167 (97.1)	351 (96.7)	1.000
Generalized wheals ^b	331 (61.9)	125 (72.7)	206 (56.7)	<0.001^a
Maximal wheal duration (min)	30.0 (15.0–60.0), <i>n</i> = 506	30.0 (20.0–60.0), <i>n</i> = 157	30.0 (15.0–60.0), <i>n</i> = 349	0.256
Cutaneous angioedema ^c	312 (58.3)	120 (69.8)	192 (52.9)	<0.001^a
Maximal cutaneous angioedema duration (min)	45.0 (20.0–90.0), <i>n</i> = 231	45.0 (20.0–120), <i>n</i> = 102	40.0 (20.0–60.0), <i>n</i> = 129	0.460
Any cardiovascular symptoms (with or without loss of consciousness)	149 (27.9)	74 (43.0)	75 (20.7)	<0.001^a
Loss of consciousness or documented hypotension (<90/60 mmHg)	63 (11.8)	34 (19.8)	29 (8.0)	<0.001^a
Difficulty breathing ^d	106 (19.8)	69 (40.1)	37 (10.2)	<0.001^a
Gastrointestinal symptoms ^d	54 (10.1)	29 (16.9)	25 (6.9)	0.001^a
Relevant triggers of CRs				
Number of relevant triggers of CRs	3.0 (2.0–4.0)	4.0 (3.0–5.0)	3.0 (2.0–4.0)	<0.001^a
Cold air	472 (88.2)	156 (90.7)	316 (87.1)	0.252
Full cold-water immersion	366 (68.4)	124 (72.1)	242 (66.7)	0.232
Localized skin contact with cold liquids	347 (64.9)	135 (78.5)	212 (58.4)	<0.001^a
Localized skin contact with cold surfaces	316 (59.1)	136 (79.1)	180 (49.6)	<0.001^a
Ingestion of cold food or drinks	183 (34.2)	172 (100)	11 (3.0)	<0.001^a
Aggravating factors of CRs				
Wind	376 (70.3)	137 (79.7)	239 (65.8)	0.001^a
Increased summer humidity	170 (32.1)	67 (39.2)	103 (28.8)	0.022^a
Associated symptoms and clinical signs				
Itch	480 (92.3)	164 (97.0)	316 (90.0)	0.004^a
Earlobe itching	220 (41.1)	90 (52.3)	130 (35.8)	<0.001^a
Fever	23 (4.3)	5 (2.9)	18 (5.0)	0.363
Malaise	106 (19.8)	40 (23.3)	66 (18.2)	0.201
Comorbidities (medical diagnosis)				
Chronic spontaneous urticaria	54 (10.1)	13 (7.6)	41 (11.3)	0.219
Atopic disease, any	204 (38.1)	68 (39.5)	136 (37.5)	0.703
Thyroid disease	79 (14.8)	25 (14.5)	54 (14.9)	1.000
Current or previous malignancy	12 (2.2)	4 (2.3)	8 (2.2)	1.000
Raynaud's phenomenon	35 (6.5)	15 (8.7)	20 (5.5)	0.190

TABLE 1 (Continued)

	Total, <i>n</i> = 535	MAO		<i>p</i> -Value
		Yes, <i>n</i> = 172 (32.1)	No, <i>n</i> = 363 (67.9)	
CST results				
Ice cube test				
Positive result	432 (95.6), <i>n</i> = 452	132 (95.7), <i>n</i> = 138	300 (95.5), <i>n</i> = 314	1.000
CSTT (s)	300 (120–300), <i>n</i> = 348	180 (60–300), <i>n</i> = 91	300 (180–300), <i>n</i> = 257	<0.001 ^c
Pseudopodial whealing	43 (9.5), <i>n</i> = 452	16 (11.6), <i>n</i> = 138	27 (8.6), <i>n</i> = 314	0.384
TT4				
Positive result	241 (77.5), <i>n</i> = 311	76 (81.7), <i>n</i> = 93	165 (75.7), <i>n</i> = 218	0.299
CTT (°C)	18.0 (14.0–23.0), <i>n</i> = 241	21.5 (16.0–25.0), <i>n</i> = 76	17.0 (12.0–22.0), <i>n</i> = 165	<0.001 ^c
Maximal wheal diameter (mm)	9.0 (5.0–13.0), <i>n</i> = 172	10.0 (7.0–12.0), <i>n</i> = 63	8.0 (5.0–13.0), <i>n</i> = 109	0.052
TT3				
Positive result	50 (98.0), <i>n</i> = 51	10 (100), <i>n</i> = 10	40 (97.6), <i>n</i> = 41	1.000
CTT (°C)	16.0 (14.0–20.5), <i>n</i> = 50	17.0 (14.0–21.0), <i>n</i> = 10	16.0 (14.0–21.5), <i>n</i> = 40	0.824
Maximal wheal diameter (mm)	14.0 (10.0–20.0), <i>n</i> = 41	20.0 (10.0–40.0), <i>n</i> = 7	13.0 (10.0–19.3), <i>n</i> = 34	0.244
PROMs				
DLQI score	5.0 (1.0–10.0), <i>n</i> = 535	6.0 (2.0–14.0), <i>n</i> = 172	4.0 (1.0–9.0), <i>n</i> = 363	0.002 ^c
UCT score	10.0 (6.0–13.0), <i>n</i> = 520	10.0 (5.0–13.0), <i>n</i> = 168	11.0 (7.0–13.0), <i>n</i> = 352	0.152
UCT ≥12	207 (39.8), <i>n</i> = 520	62 (36.9), <i>n</i> = 168	145 (41.2), <i>n</i> = 352	0.389

Note: Categorical variables are expressed as counts (percentages). Numerical variables are presented as medians (IQR). If data were not obtained for all patients, the patient numbers are displayed as “*n*” next to the results.

Abbreviations: BMI, body mass index; ColdU, cold urticaria; CRs, cold-induced reactions; CST, cold stimulation testing; CSTT, critical stimulation time threshold; CTT, critical temperature threshold; DLQI, Dermatology Life Quality Index; IQR, interquartile range; MAO, mucosal angioedema involving the oropharynx; *n*, number of patients; PROMs, patient-reported outcome measures; TT3, TempTest® version 3.0; TT4, TempTest® version 4.0; UCT, Urticaria Control Test.

^aFisher's exact test.

^bAffecting more than two body regions.

^cDeeper swellings with imprecise borders on any location on the skin, excluding MAO.

^dNot specifically defined.

^eMann–Whitney test.

TABLE 2 Spearman's correlation between local cold stimulation testing (CST) results.

	CSTT	CTT (TT4)	CTT (TT3)	Max wheal diameter (TT4)	Max wheal diameter (TT3)
CSTT	NA	−0.333***	−0.453**	−0.444***	.
CTT (TT4)	−0.330***	NA	NA	0.615***	NA
CTT (TT3)	−0.453**	NA	NA	NA	0.333*
Max wheal diameter (TT4)	−0.444***	0.615***	NA	NA	NA
Max wheal diameter (TT3)	.	NA	0.333*	NA	NA
Number or relevant cold triggers	−0.136*	0.220**	.	0.213**	.

Note: Statistical significance is indicated by asterisks: * for $p < 0.05$, ** for $p < 0.01$, *** for $p < 0.001$ and a dot (.) for $p \geq 0.05$.

Abbreviations: CSTT, critical stimulation time threshold; CTT, critical temperature threshold; NA, not applicable; TT3, TempTest® version 3.0; TT4, TempTest® version 4.0.

CONFLICT OF INTEREST STATEMENT

Mojca Bizjak is or recently was a speaker and/or advisor for Novartis and Swixx BioPharma, outside the submitted work. Jonny Peter is or recently was a speaker and/or advisor for or received research funding from Takeda, Kalvista, Astria, CSL Behring, Sanofi, HAE international and Pharvaris, outside the submitted work. Ana Maria Giménez-Arnau

is or recently was a speaker and/or advisor for or received research funding from Escient, Noucor, Novartis, Instituto Carlos III-Feder, Uriach, Almirall, Amgen, Blueprint Medicines, Celldex, Escient, Faes, Genentech, GSK, Jaspers, Leo, Mitsubishi Tanabe, Sanofi, Thermo Fisher Scientific, Septerna, Avene, Menarini and MSD, outside the submitted work. David Pesqué reports an institutional grant from Leo

Foundation, outside the submitted work. Margarida Gonalo has been a speaker and/or advisor for or has received research funding from Abbvie, Pfizer, Biocryst, Almirall, Leo, Novartis, Sanofi and Janssen, outside the submitted work. Sabine Altrichter is or recently was a speaker and/or advisor for or received research funding from ALK, Bencard, BioCryst, Blueprint, CSL Behring, Leo Pharma, Incyte, Kalvista, Novartis, Phavaris, Sanofi, Takeda, Thermofisher, ADR-AC, ALK, Celltrion, CSL Behring, Novartis, Allakos and Astra Zeneca, outside the submitted work. Andrea Bauer reports grants, personal fees and/or other from Novartis, Leo, Sanofi, Amgen, Lilly, AbbVie, Takeda, Almirall, L'Oreal, Kalvista, Otsuka and Pharvaris, outside the submitted work. Elena Borzova received honoraria from Euforea and WAO, outside the submitted work. C elia Costa reports personal fees from Novartis, AstraZeneca, Menarini, Leti, Jaba Recordatdi, Takeda, Sanofi and Bial, outside the submitted work. Luis Felipe Ensina reports personal fees from Sanofi, Novartis, Abbvie and Celltrion, outside the submitted work. Jesper Gr onlund Holm has been a speaker for Novartis and advisor for Sanofi, outside the submitted work. Aliya Klyucharova received honoraria from Novartis and AstraZeneca, outside the submitted work. Emek Kocat urk reports personal fees from Almirall, Novartis and Menarini, outside the submitted work. Kanokvalai Kulthanan received honoraria from Novartis, Menarini and Sanofi, outside the submitted work. Michael Makris reports personal fees from AstraZeneca, GSK, Elpen, Sanofi, Novartis, Chiesi, Menarini and Swixx, outside the submitted work. Simon Francis Thomsen is or recently was a speaker and/or advisor for or received research funding from Sanofi, AbbVie, LEO Pharma, Novartis, UCB Pharma, Janssen Pharmaceuticals, Almirall, Pfizer, Eli Lilly, Union Therapeutics, Symphogen and Janssen Pharmaceuticals, outside the submitted work. Daria Fomina, Fernando Monteiro Aarestrup, Dalia Melina Ahsan, Mona Al-Ahmad, Gerelma Andrenova, Roberta Fachini Criado, Semra Demir, Dejan Dinevski, Asli Gelincik, Maia Gotua, Naoko Inomata, Maryam Khoshkhui, Mitja Ko nik, Eduardo M. de Souza Lima, Rongbiao Lu, Raisa Meshkova, Maria Pasali, Marisa Paulino, German Dario Ram on, Carla Ritchie, Michael Rudenko, Solange Oliveira Rodrigues Valle, Nicola Wagner, Paraskevi Xepapadaki, Xiaoyang Xue, Alicja Kasperska-Zajac, Zuotao Zhao and Dorothea Terhorst-Molawi have no relevant conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICAL APPROVAL

The study was approved by the National Medical Ethics Committee of the Republic of Slovenia (KME0120-62/2019/4), the Ethics Committee at Charit  Universit tsmedizin Berlin (EA1/069/19) and the Ethics Committees of the other participating institutions.

ETHICS STATEMENT

All patients provided written informed consent for participation and publication.

Mojca Bizjak^{1,2} 
 Daria Fomina^{3,4} 
 Jonny Peter^{5,6} 
 Ana Maria Gim enez-Arnau⁷ 
 David Pesqu e⁸ 
 Margarida Gonalo⁹ 
 Fernando Monteiro Aarestrup¹⁰ 
 Dalia Melina Ahsan^{11,12} 
 Mona Al-Ahmad¹³ 
 Sabine Altrichter^{11,12,14,15} 
 Gerelma Andrenova³ 
 Andrea Bauer¹⁶ 
 Elena Borzova¹⁷ 
 C elia Costa¹⁸ 
 Roberta Fachini Criado¹⁹ 
 Semra Demir²⁰ 
 Dejan Dinevski²¹ 
 Luis Felipe Ensina²² 
 Asli Gelincik²⁰ 
 Maia Gotua²³ 
 Jesper Gr onlund Holm²⁴ 
 Naoko Inomata²⁵ 
 Maryam Khoshkhui²⁶ 
 Aliya Klyucharova^{27,28} 
 Emek Kocat urk^{11,12,29} 
 Mitja Ko nik^{1,2} 
 Kanokvalai Kulthanan³⁰ 
 Eduardo M. de Souza Lima¹⁰ 
 Rongbiao Lu³¹ 
 Michael Makris³² 
 Raisa Meshkova³³ 
 Maria Pasali³² 
 Marisa Paulino¹⁸ 
 German Dario Ram on³⁴ 
 Carla Ritchie³⁵ 
 Michael Rudenko³⁶ 
 Simon Francis Thomsen²² 
 Solange Oliveira Rodrigues Valle³⁷ 
 Nicola Wagner³⁸ 
 Paraskevi Xepapadaki³⁹ 
 Xiaoyang Xue⁴⁰ 
 Alicja Kasperska-Zajac⁴¹ 
 Zuotao Zhao⁴² 
 Dorothea Terhorst-Molawi^{11,12} 

¹Division of Allergy, University Clinic of Respiratory and Allergic Diseases Golnik, Golnik, Slovenia

²Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia

³Moscow Clinical and Research Center of Allergy and Immunology, State Hospital 52, Moscow Ministry of Healthcare, Moscow, Russian Federation

- ⁴Department of Clinical Immunology and Allergology, I.M. Sechenov First Moscow State Medical University, Moscow, Russian Federation
- ⁵Division of Allergy and Clinical Immunology, Department of Medicine, University of Cape Town, Cape Town, South Africa
- ⁶Allergy and Immunology Unit, University of Cape Town Lung Institute, Cape Town, South Africa
- ⁷Dermatology Department, Hospital del Mar Research Institute, Universitat Pompeu Fabra (UPF), Barcelona, Spain
- ⁸Dermatology Department, Hospital del Mar Research Institute, Department of Medicine, Universitat Autònoma de Barcelona (UAB), Barcelona, Spain
- ⁹Clinic of Dermatology, University Hospital, Coimbra Local Health Unit and Faculty of Medicine, University of Coimbra, Coimbra, Portugal
- ¹⁰Faculdade de Ciências, Médicas e da Saúde de Juiz de Fora (SUPREMA), Hospital Maternidade Therezinha de Jesus, Belo Horizonte, Brazil
- ¹¹Institute of Allergology, Charité – Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin and Humboldt-Universität Zu Berlin, Berlin, Germany
- ¹²Fraunhofer Institute for Translational Medicine and Pharmacology (ITMP), Immunology and Allergology, Berlin, Germany
- ¹³Microbiology Department, Faculty of Medicine, Kuwait University, Safat, Kuwait
- ¹⁴Department of Dermatology and Venerology, Comprehensive Allergy Center, Kepler University Hospital, Linz, Austria
- ¹⁵Center for Medical Research, Johannes Kepler University, Linz, Austria
- ¹⁶Department of Dermatology, University Allergy Center, University Hospital Carl Gustav Carus, Technical University, Dresden, Germany
- ¹⁷Dermatology Division, Graduate School of Medical and Dental Sciences, Niigata University, Niigata, Japan
- ¹⁸Immunoallergology Department, Hospital de Santa Maria, CHULN, Lisbon, Portugal
- ¹⁹Faculdade de Medicina do ABC (FMABC), Santo André, Brazil
- ²⁰Division of Allergy, Department of Internal Medicine, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey
- ²¹Faculty of Medicine, University of Maribor, Maribor, Slovenia
- ²²Division of Allergy, Clinical Immunology and Rheumatology, Department of Pediatrics, Federal University of São Paulo, São Paulo, Brazil
- ²³Center of Allergy and Immunology, David Tvildiani Medical University, Tbilisi, Georgia
- ²⁴Department of Dermatology, Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark
- ²⁵Department of Environmental Immunology, Yokohama City University Graduate School of Medicine, Yokohama, Japan
- ²⁶Allergy Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
- ²⁷City Center of Allergology and Immunology, City Clinical Hospital No. 7 named after M.N. Sadykov, Kazan, Russia
- ²⁸Department of Internal Diseases, Institute of Fundamental Medicine and Biology (IFMB) of Kazan Federal University, Kazan, Russia
- ²⁹Department of Dermatology, Bahçeşehir University, Istanbul, Turkey
- ³⁰Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand
- ³¹Department of Dermatology, The Third Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China
- ³²Allergy Unit, Second Department of Dermatology and Venereology, National and Kapodistrian University of Athens, University General Hospital “Attikon”, Athens, Greece
- ³³Department of Clinical Immunology and Allergology, Smolensk State Medical University, Smolensk, Russian Federation
- ³⁴Instituto de Alergia e Inmunologia del Sur, Buenos Aires, Argentina
- ³⁵Adults and Pediatrics Allergy Unit, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina
- ³⁶London Allergy and Immunology Centre, London, UK
- ³⁷Department of Internal Medicine, Immunology Service, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil
- ³⁸Department of Dermatology, Uniklinikum Erlangen, Friedrich Alexander University Erlangen-Nürnberg (FAU), Erlangen, Germany
- ³⁹Allergy Unit, 2nd Pediatric Clinic, National and Kapodistrian University of Athens, Athens, Greece
- ⁴⁰Department of General Practice, Community Health Service Center, Guangzhou City, China
- ⁴¹European Center for Diagnosis and Treatment of Urticaria/Angioedema (GA2LEN UCARE/ACARE Network) & Department of Clinical Allergology and Urticaria of Medical University of Silesia, Zabrze, Poland
- ⁴²Department of Dermatology and Venerology, Beijing Key Laboratory of Molecular Diagnosis on Dermatoses and National Clinical Research Center for Skin and Immune Diseases, Peking University First Hospital, Beijing, China

Correspondence

Mojca Bizjak, Division of Allergy, University Clinic of Respiratory and Allergic Diseases Golnik, Golnik 36, 4204 Golnik, Slovenia.

Email: mojca.bizjak@klinika-golnik.si

ORCID

Mojca Bizjak  <https://orcid.org/0000-0003-2595-468X>

Daria Fomina  <https://orcid.org/0000-0002-5083-6637>
 Jonny Peter  <https://orcid.org/0000-0002-2658-0723>
 Ana Maria Giménez-Arnau  <https://orcid.org/0000-0001-5434-7753>
 David Pesqué  <https://orcid.org/0000-0002-5821-9780>
 Margarida Gonçalves  <https://orcid.org/0000-0001-6842-1360>
 Mona Al-Ahmad  <https://orcid.org/0000-0003-3720-7032>
 Sabine Altrichter  <https://orcid.org/0000-0001-9955-385X>
 Gerelma Andrenova  <https://orcid.org/0000-0001-7053-3900>
 Andrea Bauer  <https://orcid.org/0000-0002-4411-3088>
 Elena Borzova  <https://orcid.org/0000-0003-1587-9137>
 Célia Costa  <https://orcid.org/0000-0001-8313-1505>
 Roberta Fachini Criado  <https://orcid.org/0000-0003-2482-3047>
 Semra Demir  <https://orcid.org/0000-0003-3449-5868>
 Dejan Dinevski  <https://orcid.org/0000-0001-5285-2246>
 Luis Felipe Ensina  <https://orcid.org/0000-0001-8652-3619>
 Asli Gelincik  <https://orcid.org/0000-0002-3524-9952>
 Maia Gotua  <https://orcid.org/0000-0003-2497-4128>
 Jesper Grønlund Holm  <https://orcid.org/0000-0002-5079-8562>
 Naoko Inomata  <https://orcid.org/0000-0002-1989-9824>
 Maryam Khoshkhuhi  <https://orcid.org/0000-0002-0363-6536>
 Aliya Klyucharova  <https://orcid.org/0000-0001-9045-5831>
 Emek Kocatürk  <https://orcid.org/0000-0003-2801-0959>
 Mitja Košnik  <https://orcid.org/0000-0002-4701-7374>
 Kanokvalai Kulthanan  <https://orcid.org/0000-0002-7618-821X>
 Eduardo M. de Souza Lima  <https://orcid.org/0009-0003-8406-7586>
 Rongbiao Lu  <https://orcid.org/0000-0001-8609-2361>
 Michael Makris  <https://orcid.org/0000-0003-2713-2380>
 Raisa Meshkova  <https://orcid.org/0000-0002-7806-9484>
 Maria Pasali  <https://orcid.org/0000-0002-6513-0792>
 Marisa Paulino  <https://orcid.org/0000-0002-2568-3333>
 German Dario Ramón  <https://orcid.org/0000-0001-9990-8147>
 Michael Rudenko  <https://orcid.org/0000-0002-6065-9451>

Simon Francis Thomsen  <https://orcid.org/0000-0002-4838-300X>
 Solange Oliveira Rodrigues Valle  <https://orcid.org/0000-0001-5512-7349>
 Nicola Wagner  <https://orcid.org/0000-0002-6040-9305>
 Paraskevi Xepapadaki  <https://orcid.org/0000-0001-9204-1923>
 Xiaoyang Xue  <https://orcid.org/0000-0003-0059-0541>
 Alicja Kasperska-Zajac  <https://orcid.org/0000-0002-2000-0070>
 Zuotao Zhao  <https://orcid.org/0000-0002-9595-6050>
 Dorothea Terhorst-Molawi  <https://orcid.org/0000-0001-9411-8998>

REFERENCES

1. Bizjak M, Rutkowski K, Asero R. Risk of anaphylaxis associated with cold Urticaria. *Curr Treat Options Allergy*. 2024;11(3):167–75.
2. Ornek Ozdemir S, Kuteyla Can P, Degirmen-tepe EN, Cure K, Singer R, Kocaturk E. A comparative analysis of chronic inducible urticaria in 423 patients: clinical and laboratory features and comorbid conditions. *J Eur Acad Dermatol Venereol*. 2024;38(3):513–20.
3. Bizjak M, Kosnik M, Terhorst-Molawi D, Dinevski D, Maurer M. Cold agglutinins and Cryoglobulins associate with clinical and laboratory parameters of cold Urticaria. *Front Immunol*. 2021;12:665491.
4. Jain SV, Mullins RJ. Cold urticaria: a 20-year follow-up study. *J Eur Acad Dermatol Venereol*. 2016;30(12):2066–71.
5. Bizjak M, Kosnik M, Dinevski D, Thomsen SF, Fomina D, Borzova E, et al. Risk factors for systemic reactions in typical cold urticaria: results from the COLD-CE study. *Allergy*. 2022;77(7):2185–99.
6. Bizjak M, Maurer M, Kosnik M, Terhorst-Molawi D, Zver S, Burmeister T, et al. Severe cold urticaria can point to an underlying clonal mast cell disorder. *Allergy*. 2021;76(8):2609–13.
7. Magerl M, Abajian M, Krause K, Altrichter S, Siebenhaar F, Church MK. An improved Peltier effect-based instrument for critical temperature threshold measurement in cold- and heat-induced urticaria. *J Eur Acad Dermatol Venereol*. 2015;29(10):2043–5.
8. Bizjak M, Kosnik M. Key differences between chronic inducible and spontaneous urticaria. *Front Allergy*. 2024;5:1487831.
9. Weller K, Gimenez-Arnau A, Grattan C, Asero R, Mathelier-Fusade P, Bizjak M, et al. The chronic Urticaria registry: rationale, methods and initial implementation. *J Eur Acad Dermatol Venereol*. 2021;35(3):721–9.
10. Bizjak M, Kosnik M, Dinevski D, Thomsen SF, Fomina D, Borzova E, et al. Adrenaline autoinjector is underprescribed in typical cold urticaria patients. *Allergy*. 2022;77(7):2224–9.