

Legend

Figure 1 - Diagnostic algorithm

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Table 1 - Demographic, clinical, and laboratory characteristics of patients

Characteristic	SJS/TEN (n=36)	DRESS (n=32)	AGEP (n=3)	GBFDE (n=1)	Control (n=2)
Age (years)				21	
median (IQR)	29.5(13.75-46)	31(12.75-53.75)	-	-	-
average (min-max)	-	-	42 (16-55)	-	66 (50-82)
Skin color/ethnicity n (%)					
Brown	16(44.44)	19 (59.37)	2 (66.66)	1 (100)	-
White	8(22.22)	8 (28.12)	1 (33.33)	-	-
Black	11(30.55)	3 (9.37)	-	-	2 (100)
Yellow	1(2.77)	1 (3.12)	-	-	-
Sex n (%)					
Female	21 (58.33)	14 (43.75)	3 (100)	-	2 (100)
Male	15 (41.66)	18 (56.25)	-	1 (100)	-
Risk factor n (%)					
Autoimmunity	4 (11.11)	3 (9.37)	1 (33.33)	-	1 (50)
HIV serology	2 (5.55)	2 (6.25)	-	-	-
HLA risk allele presence	4 (11.11)	3 (9.37)	-	-	1 (50)
Latency period (days)				2	
median (IQR)	15 (6.75-22.5)	15 (15-28.5)		-	
average (min-max)			12.5 (2-15)		15 (10-20)
Clinical findings n(%)					
Skin involvement	36 (100)	32 (100)	3 (100)	1 (100)	2 (100)
Mucosal involvement	36 (100)	6 (18.75)	-	1(100)	1 (50)
Lymphadenopathy	3 (8.33)	19 (59.37)	1 (33.33)	-	1 (50)
Fever ≥ 38°C	32 (91.66)	31 (96.87)	2 (67.70)	1 (100)	2 (100)
Hematologic findings n (%)					
Eosinophilia	-	25 (78.12)	-	-	2 (100)
Neutrophilia (> 7,000)	-	-	3 (100)	-	1 (50)
Involved organs n (%)					
Liver	6 (16.66)	31 (96.87)	-	-	2 (100)
Gastrointestinal	1 (2.77)	5 (15.62)	-	-	-
Kidney	6 (16.66)	6 (18.75)	-	-	-
Lung	5 (13.88)	8 (32.0)	1 (33.33)	-	1 (50)
Heart	5 (13.88)	6 (18.75)	-	-	-
SNC	2 (5.55)	3 (9.37)	-	-	-
Treatment n (%)					
Systemic corticosteroid	24 (66.66)	27 (84.37)	3 (100.0)	1 (100)	2 (100)
Systemic corticosteroid + IGIV	6 (16.66)	3 (9.37)	-	-	-

IGIV	4 (11.11)	-	-	-	-
Supportive care only	2 (5.55)	-	-	-	-
Treatment time (days)				18	
median (IQR)	24 (5-52.5)	120 (30 -180)	-	-	-
average (min-max)			36 (4-90)	-	55 (20-90)
Inpatient stay (days)				10	
median (IQR)	19.5(13-29.5)	15 (12-30)	-	-	-
average (min-max)			2.5 (1-4)	-	16.5 (12-21)
Death n (%)	-	2 (6.25)	-	-	-

SJS: Stevens-Johnson Syndrome; TEN: Toxic Epidermal Necrolysis; DRESS: Drug Reaction with Eosinophilia and Systemic Symptoms; AGEP: Acute Generalized Exanthematous Pustulosis; GBFDE: Generalized Bullous Fixed Drug Eruption; IQR: interquartile range; HLA: human leukocyte antigen; IGIV: intravenous immunoglobulin.

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Table 2 – Etiology of SCAR

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Drugs	DRESS/DIHS n=32 (%)	SJS/TEN n=36 (%)	AGEP n=3 (%)	GBFDE n=1 (%)	Overlap n=2 (%)	Total n=74 (%)
Aromatic anticonvulsants	20 (62.5)	23 (63.88)	0 (0.00)	0 (0.00)	0 (0.00)	43 (58.11)
Carbamazepine	8	5	0	0	0	13 (17.57)
Lamotrigine	1	5	0	0	0	6 (8.10)
Oxcarbazepine	1	0	0	0	0	1 (1.35)
Phenobarbital	2	7	0	0	0	9 (12.16)
Phenytoin	8	6	0	0	0	14 (18.92)
Antibiotics	5 (15.62)	22 (61.11)	1 (33.33)	0 (0.00)	0 (0.00)	28 (37.83)
Azithromycin	0	1	0	0	0	1 (1.35)
Amoxicilin	0	3	1	0	0	4 (5.40)
Ampicilin	0	1	0	0	0	1 (1.35)
Benzathin penicilina	0	1	0	0	0	1 (1.35)
Meropenem	0	3	0	0	0	3 (4.05)
Cefaclor	0	1	0	0	0	1 (1.35)
Cefalexine	1	0	0	0	0	1 (1.35)
Cefepime	0	1	0	0	0	1 (1.35)
Ceftriaxone	1	1	0	0	0	2 (2.70)
Chloramphenicol	0	1	0	0	0	1 (1.35)
Gentamicina	0	1	0	0	0	1 (1.35)
Quinolone	0	2	0	0	0	2 (2.70)
Sulfamethoxazole	2	3	0	0	0	5 (6.75)
Tetracycline	0	1	0	0	0	1 (1.35)
Vancomycin	1	2	0	0	0	3 (4.05)
Antiviral drugs	1 (3.12)	2 (5.55)	0 (0.00)	0 (0.00)	0 (0.0)	3 (4.05)
Abacavir	1	0	0	0	0	1 (1.35)
Nevirapine	0	2	0	0	0	2 (2.07)
Allopurinol	2 (6.25)	7 (19.44)	1 (33.33)	0 (0.00)	1(50.0)	11 (14.86)
Analgesic/anti-inflammatory	5 (15.62)	10 (27.77)	2 (66.6)	1 (100.0)	2 (100.0)	18 (24.32)
Diclofenac	0	3	1	0	0	4 (5.40)
Ibuprofen	0	3	0	0	0	3 (4.05)
Naproxen	0	1	0	0	1	2 (2.70)
Nimesulide	0	2	0	0	0	2 (2.70)
Tenoxicam	0	1	0	0	0	1 (1.35)
Dipyrrone	4	3	0	1	1	9 (12.16)
Acetaminophen	1	0	1	0	0	2 (2.70)
Non-antimicrobial sulfonamides	5 (15.62)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	5 (6.75)
Dapsone	2	0	0	0	0	2 (3.07)

Sulfasalazine	2	0	0	0	0	2 (3.07)
Sulfadiazine	1	0	0	0	0	1(1.35)
Dexamethasone	0	0	1	0	0	1 (1.35)

SJS: Stevens-Johnson syndrome; TEN:Toxic epidermal necrolysis; DRESS: Drug reaction with eosinophilia and systemic symptoms; AGEP:Acute generalized exanthematous pustulosis , GBFDE:Generalized bullous fixed drug eruption.

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Table 3 – Drug PatchTest (SCAR)

Case	Drug	SCAR	C (%)	T (years)	Results
1	CBZ	DRESS	5	< 1	Positive
2	CBZ	DRESS	10	1-2	Positive
3	CBZ	DRESS	10	< 1	Positive
4	CBZ	DRESS	10	1-2	Positive
5	CBZ	DRESS	5	<1	Positive
6	PB	DRESS	30	< 1	Positive
7	CBZ	DRESS	5	1-2	Negative
8	PHT	DRESS	30	4-5	Negative
9	PHT	DRESS	10	3-4	Negative
10	SZ	DRESS	10*	3-4	Negative
11	DAP	DRESS	10**	1-2	Negative
12	CEF	DRESS	30	2-3	Negative
13	AC/DIP	DRESS	10**	5-6	Negative
14	ALLO	DRESS/AGEP	30	1-2	Negative
15	Multiple*	SJS/TEN	10	1-2	Negative
16	LMT	SJS/TEN	30	1-2	Negative
17	LMT	SJS/TEN	10**	1-2	Negative
18	PB	SJS/TEN	30	1-2	Negative
19	PB	SJS/TEN	30	2	Negative
20	PB	SJS/TEN	30	3-4	Negative
21	CBZ	SJS/TEN	30	2-3	Negative
22	CBZ	SJS/TEN	30	1-2	Negative
23	CBZ	SJS/TEN	30	3-4	Negative
24	CBZ	SJS/TEN	30	6-7	Negative
25	LEVO	SJS/TEN	10**	<1	Negative
26	AZI/DIP	SJS/TEN	30/10**	<1	Negative
27	ALLO	SJS/TEN	10**	5-6	Negative
28	ALLO	SJS/TEN	10**	1-2	Negative
29	AMX/CT	AGEP	30/1	<1	Negative
30	NSAID	AGEP	10**	<1	Negative

AC:acetaminophen; ALLO: allopurinol; CBZ:carbamazepine; C: concentration; CEF: ceftriaxone
DAP:dapsone;DIP:dipyrrone;PB:phenobarbital;PHT:phenytoin;SZ:sulfasalazine;Multiple*:(SMX:S
ulfamethoxazole;NVP:nevirapine;LMT:lamotrigine;PHT:phenytoin;TNX:tenoxicam);10**:pure

substance a 10%; SJS: Stevens-Johnson syndrome; TEN: toxic epidermal necrolysis; T: time; DRESS: drug reaction with eosinophilia and systemic symptoms; AGEP acute generalized exanthematous pustulosis; GBFD: generalized bullous fixed drug eruption.

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Table 4 – HLA-A, -B and -DRB1 alleles in DRESS, SJS/TEN and DRESS/AGEP samples with HLA-A*31, -B*57 or -B*58

DRUG	SCAR	HLA-A*	HLA-B*	HLA-DRB1*
CBZ	DRESS	24:02:01:01	40:02:01:01	04:05:01:01
		31:01:02:01	51:01:01:01	04:05:01:03
CBZ	DRESS	31:01:02:01	39:03:01:01	13:02:01:01
		34:02:01	81:01:01	14:02:01:02
ABC	DRESS	01:01:01:01	38:01:01:01	04:02:01:01
		26:01:01:01	57:01:01:01	13:01:01:02
ALLO	SJS/TEN	02:01:01	58:01:01	11:02:01
		32:01:01	40:02:01	10:02:01
ALLO	SJS/TEN	23:17:01:01	42:02:01:02	07:01:01:01
		30:01:01:01	58:01:01:01	12:01:01:01
ALLO	SJS/TEN	03:01:01:01	35:01:01:05	01:01:01:01
		30:02:01:01	58:01:01:01	11:04:01
ALLO	DRESS/AGEP	02:02:01:01	53:01:01	13:02:01:03
		33:03:01:01	58:01:01:03	15:03:01:02
ALLO	SJS/TEN	01:01:01:01	35:01:01:05	01:01:01
		03:01:01:01	58:01:01:01	07:01:01:01

ALLO: Allopurinol; ABC: Abacavir; CBZ: Carbamazepine; AGEP: Acute Generalized Exanthematous Pustulosis; DRESS: Drug Reaction with Eosinophilia and Systemic Symptoms; SJS: Stevens-Johnson Syndrome; TEN: Toxic Epidermal Necrolysis. HLA Typing were performed with massive parallel sequencing.

References

1. The RegiSCAR project [homepage on the Internet] Diseases of interest [accessed 30 Jul 2019]. Available at: <http://www.regiscar.org>
2. Chung W-H, Wang C-W, Dao R-L. Severe cutaneous adverse drug reactions. *J Dermatol.* 2016;43(7):758–66.
3. Isvy-Joubert A, Ingen-Housz-Oro S, Vincent R, Haddad C, Valeyrie-Allanore L, Chosidow O, et al. Severe cutaneous adverse reactions to drugs: From patients to the national office for compensation of medical accidents. *Dermatology.* 2014;228 (4):338–43.
4. Teo Y X, Walsh SA. Severe adverse drug reactions. *Clin Med.* 2016;16(1):79–83.
5. Knowles SR, Shear NH. Recognition and Management of Severe Cutaneous Drug Reactions. *Dermatol Clin.* 2007;25:245–55.
6. Barbaud A, Collet E, Milpied B, Assier H, Staumont D, Arnel-Audran M, et al. A multicentre study to determine the value and safety of drug patch tests for the three main classes of severe cutaneous adverse drug reactions. *Br J Dermatol.* 2012;168:555–6.
7. Cheng CY, Su SC, Chen CH, Chen WL, Deng ST, Chung WH. HLA associations and clinical implications in T-cell mediated drug hypersensitivity reactions: An updated review. *J Immunol Res.* 2014;2014.
8. Amstutz U, Shear NH, Rieder MJ, Hwang J, Fung V, Nakamura H, et al. Recommendations for HLA-B15:02 and HLA-A31:01 genetic testing to reduce the risk of carbamazepine induced hypersensitivity reactions. *Epilepsia.* 2014;55:496–506.
9. IBGE. Histórico da investigação sobre cor ou raça nas pesquisas domiciliares do IBGE. 2003;16.
10. Demoly P, Kropf R, Pichler W J, Bircher A. Drug hypersensitivity: questionnaire. *Allergy.* 1999;54:999–1003.
11. Grupo de Assessoria em Alergia a Drogas da ASBAI. Questionário específico para a investigação das reações de hipersensibilidade por drogas. *Rev bras alerg imunopatol.* 2011;34 (5):214.
12. Kardaun S, Sidoroff A, Valeyrie-Allanore L, Al E. Variability in the clinical pattern of cutaneous side effects of drugs with systemic symptoms: does a DRESS syndrome really exist? *Br J Dermatol.* 2007;156:609
13. Szatkowski J, Schwartz RA. Acute generalized exanthematous pustulosis (AGEP): A review and update. *J Am Acad Dermatol.* 2015;73(5):843–8.
14. Bastuji-Garin S, Rzany B, Stern RS, Shear NH, Naldi L, Roujeau J. Clinical Classification of Cases of Toxic Epidermal Necrolysis, Stevens-Johnson Syndrome and Erythema Multiforme. *Arch Dermatol.* 1993;129:92-96
15. Lhuvresse S, Valeyrie-Allanore L, Ortonne N, Konstantinou M-P, Kardaun SH, Bagot M, et al. Toxic epidermal necrolysis, DRESS, AGEP: Do overlap cases exist? *Orphanet J Rare Dis.* 2012;7:72.
16. Kardaun SH, Sekula P, Valeyrie-Allanore L, Liss Y, Chu CY, Creamer D, et al. Drug reaction with eosinophilia and systemic symptoms (DRESS):

- An original multisystem adverse drug reaction. Results from the prospective RegiSCAR study. *Br J Dermatol.* 2013;169:1071–80.
17. Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I RE et al. *Clin Pharmacol Ther.* 1981;30 (2):239–45.
 18. Sassolas B, Haddad C, Mockenhaupt M, Dunant A, Liss Y, Bork K, et al. ALDEN, an Algorithm for Assessment of Drug Causality in Stevens–Johnson Syndrome and Toxic Epidermal Necrolysis: Comparison With Case–Control Analysis. *Clin Pharmacol Ther.* 2010;88 (1):60–8
 19. Barbaud a, Gonçalo M, Bruynzeel D, Bircher A. Guidelines for performing skin tests with drugs in the investigation of cutaneous adverse drug reactions. *Contact Dermatitis.* 2001;45:321–8.
 20. Grando LR, Schmitt TAB, Bakos RM. Severe cutaneous reactions to drugs in the setting of a general hospital. *An Bras Dermatol.* 2014;89(5):758–62.
 21. Orime M. Immunohistopathological Findings of Severe Cutaneous Adverse. *J Immunol Res.* 2017;2017:1–5.
 22. Walsh S A., Creamer D. Drug reaction with eosinophilia and systemic symptoms (DRESS): A clinical update and review of current thinking. *Clin Exp Dermatol.* 2011;36:6–11
 23. Kellett S, Cock C. A Case of Drug Reaction with Eosinophilia and Systemic Symptoms. *Case Rep Med.* 2012;2012(3):1–4.
 24. Shiohara T, Mizukawa Y. Drug-induced hypersensitivity syndrome (DiHS)/ drug reaction with eosinophilia and systemic symptoms (DRESS): An update in 2019. *Allergol Int.* 2019, 69 (3):301-8.
 25. Mirakian R, Ewan PW, Durham SR, Youlten LJF, Dugué P, Friedmann PS, et al. BSACI guidelines for the management of drug allergy. *Clin Exp Allergy* 2009;39(1):43–61.
 26. Huang H, Luo X, Chan L, Cao Z, Sun X, Xu J. Cutaneous adverse drug reactions in a hospital-based Chinese population. *Clin Exp Dermatol.* 2011; 36(2):135-41.
 27. Lee JY, Lee S, Hahm JE, Ha JW, Kim CW, Kim SS. Clinical features of drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome : a study of 25 patients in Korea. *Int J Dermatol.* 2017; 56 (9): 944–951
 28. Messenheimer J, Mullens EL, Giorgi L, Young F. Safety review of adult clinical trial experience with lamotrigine. *Drug Saf.* 1998;18(4):281-96
 29. Stamp LK, Day RO, Yun J. Allopurinol hypersensitivity: investigating the cause and minimizing the risk. *Nat Rev Rheumatol.* 2016;12(4):235-42.
 30. Hershfield MS, Callaghan JT, Tassaneeyakul W, Mushiroda T, Thorn CF, Klein TE, et al. Clinical Pharmacogenetics Implementation Consortium Guidelines for Human Leukocyte Antigen-B Genotype and Allopurinol Dosing. *Clin Pharmacol Ther.* 2013;93(2):153–8.
 31. Saito Y, Stamp LK, Caudle KE, Hershfield M, Ellen M, Callaghan JT, et al. Supplemental Material Clinical Pharmacogenetics Implementation Consortium (CPIC) Guidelines for Human Leukocyte Antigen B (HLA-B)

- Genotype and Allopurinol Dosing: 2015 update. *Clin Pharmacol Ther.* 2016;99(1):36-7
32. Husain Z, Reddy BY, Schwartz RA. DRESS syndrome: Part I. Clinical perspectives. *J Am Acad Dermatol*; 2013;68(5):693.e1–693.e14.
 33. Husain Z, Reddy BY, Schwartz R A. DRESS syndrome: Part II. Management and therapeutics. *J Am Acad Dermatol. American Academy of Dermatology.* 2013;68(5):709.e1–709.e9
 34. Downey A, Jackson C, Harun N, Cooper A. Toxic epidermal necrolysis: Review of pathogenesis and management. *J Am Acad Dermatol. American Academy of Dermatology*; 2012;66(6):995–1003.
 35. Lipowicz S, Sekula P, Ingen-Housz-Oro S, Liss Y, Sassolas B, Dunant A, et al. Prognosis of generalized bullous fixed drug eruption: Comparison with Stevens-Johnson syndrome and toxic epidermal necrolysis. *Br J Dermatol.* 2013;168(4):726–32.
 36. Bourgeois GP, Cafardi JA, Groysman V, Hughey LC. A review of DRESS-associated myocarditis. *J Am Acad Dermatol.* 2012; 66(6): e 229-36.
 37. Morikawa D, Hiraoka E, Obunai K, Norisue Y. Myocarditis associated with drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome: A case report and review of the literature. *Am J Case Rep.* 2018;19:978–84
 38. Kano Y, Hiraharas K, Sakuma K, Shiohara T. Several herpesviruses can reactivate in a severe drug-induced multiorgan reaction in the same sequential order as in graft-versus-host disease. *Br J Dermatol.* 2006;155(2):301–6.
 39. Shiohara T. *Dermatologica Sinica* The role of viral infection in the development of severe drug eruptions. *Dermatologica Sin.* 2013;31(4):205–10.
 40. Jörg-Walther L, Schneider B, Helbling A, Helsing K, Schüller A, Wochner A, et al. Flare-up reactions in severe drug hypersensitivity: infection or ongoing T-cell hyperresponsiveness. *Clin Case Reports.* 2015;3(10):798–801
 41. Shiohara T, Kurata M, Mizukawa Y, Kano Y. Recognition of immune reconstitution syndrome necessary for better management of patients with severe drug eruptions and those under immunosuppressive therapy. *Allergol Int.* 2010; 59(4):333–43. .
 42. Sim HS, Seo JE, Chun JS, Seo JK, Lee D, Sung HS. Acute localized exanthematous pustulosis on the face. *Ann Dermatol.* 2011;23(SUPPL. 3):360–70.
 43. Villani A, Baldo A, De Fata Salvatore G, Desiato V, Ayala F, Donadio C. Acute Localized Exanthematous Pustulosis (ALEP): Review of Literature with Report of Case Caused by Amoxicillin-Clavulanic Acid. *Dermatol Ther (Heidelb) Springer Healthcare*; 2017;7(4):563–70. .
 44. Pavlos R, Mallal S, Phillips E. HLA and pharmacogenetics of drug hypersensitivity. *Pharmacogenomics.* 2012;13 (11):1285–1306

45. Garon SL, Pavlos RK, White KD, Brown NJ, Stone CA, Phillips EJ. Pharmacogenomics of off-target adverse drug reactions. *Br J Clin Pharmacol.* 2017;83(9):1896–91..
46. Fricke-Galindo I, Llerena A, López-López M. An update on HLA alleles associated with adverse drug reactions. *Drug Metab Pers Ther.* 2017;32(2):73–87.
47. Yeo SI. HLA-B*5801: utility and cost-effectiveness in the Asia-Pacific Region. *Int J Rheum Dis.* 2013;16:254–7.
48. Plumpton CO, Yip VLM, Alfirevic A, Marson AG, Pirmohamed M, Hughes DA. Cost-effectiveness of screening for HLA-A*31:01 prior to initiation of carbamazepine in epilepsy. *Epilepsia.* 2015;56(4):556–62.
49. Martin MA, Hoffman JM, Freimuth RR, Klein TE, Dong L, Pirmohamed M, et al. Clinical Pharmacogenetics Implementation Consortium Guidelines for HLA-B Genotype and Abacavir Dosing: 2014 update. *Clin Pharmacol Ther.* Nature Publishing Group; 2014;93(5):499–500.
50. Hershfield MS, Callaghan JT, Tassaneeyakul W, Mushiroda T, Thorn CF, Klein TE, et al. Clinical Pharmacogenetics Implementation Consortium Guidelines for Human Leukocyte Antigen-B Genotype and Allopurinol Dosing. *Clin Pharmacol Ther.* 2013;93(2):153–8.
51. Leckband SG, Kelsoe JR, Dunnenberger JM, George AL, Tran E, Berger R, et al. Clinical Pharmacogenetics Implementation Consortium Guidelines for HLA-B Genotype and Carbamazepine Dosing. *Clin Pharmacol Ther.* 2013. 21;94(3):324–8.
52. Rede Brasil de Imunogenética [homepage on the Internet] results / perfil-genomico-do-redome-rerem [accessed 30 jul 2019] Available at <http://imunogenetica.org>.
53. Boquett J, Schüler-facchini L, Jobim LF, Jobim M, Jurandi N, Fagundes R, et al. Self-Assessment of Color Categories and Its Relationship with HLA Profiling in Brazilian Bone Marrow Donors. *Biol Blood Marrow Transplant.* 2015;21(6):1142–4.
54. Torres L, da Silva Bouzas LF, Almada A, de Sobrino Porto LCM, Abdelhay E. Distribution of HLA-A, -B and -DRB1 antigenic groups and haplotypes from the Brazilian bone marrow donor registry (REDOME). *Hum Immunol American Society for Histocompatibility and Immunogenetics;* 2017;78(10):602–9.
55. Mayerga C, Ebo DG, Lang DM, Pichler WJ, Sabato V, Park MA, et al. Controversies in drug allergy: In vitro testing. *J Allergy Clin Immunol.* 2013;143(1):56–65
56. Barbaud A. Skin Testing in Delayed Reactions to Drugs. *Immunol Allergy Clin North Am.* 2009;29(3):517–35.
57. Shear, Neil H., Dodiuk-Gad, Roni P. Advances in Diagnosis and Management of Cutaneous Adverse Drug Reactions. In *Vitro and In Vivo Tests in Cutaneous Adverse Drug Reactions.* Springer Nature Singapore Pte Ltd; 2018.

58. Santiago F, Gonçalo M, Vieira R, Coelho S, Figueiredo A. Epicutaneous patch testing in drug hypersensitivity syndrome (DRESS). *Contact Dermatitis*. 2010;62(1):47–53.
59. Lin YT, Chang YC, Hui RCY, Yang CH, Ho HC, Hung SI, et al. A patch testing and cross-sensitivity study of carbamazepine-induced severe cutaneous adverse drug reactions. *J Eur Acad Dermatology Venereol*. 2013;27:356–64.
60. Wolkenstein P, Chosidow O, Fléchet ML, Robbiola O, Paul M, Duné L, et al. Patch testing in severe cutaneous adverse drug reactions, including Stevens-Johnson syndrome and toxic epidermal necrolysis. *Contact Dermatitis*. 1996;35(4):234–6.
61. Waton J, Tréchet P, Loss-Ayav C, Schmutz JL, Barbaud A. Negative predictive value of drug skin tests in investigating cutaneous adverse drug reactions. *Br J Dermatol*. 2009;160 (4):786–94.

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