

Tildrakizumab in the treatment of plaque psoriasis in an HIV+ patient: a case report and literature review of anti-interleukin drugs

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SUPPLEMENTARY MATERIAL

Supplementary Table 1. Search strategy used for literature screening.

Database(s): Embase Classic+Embase 1947 to 25 September 2023, Ovid MEDLINE® ALL 1946 to 25 September 2023.

Search strategy:

#	Searches	Results
1	biologic.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	196,302
2	secukinumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	9,421
3	ustekinumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	16,417
4	ixekizumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	4,773
5	bimekizumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	647
6	guselkumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	2,968
7	tildrakizumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	1,412
8	risankizumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	1,987

9	brodalumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	2,576
10	bimekizumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	647
11	il-17.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	60,076
12	il-23.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	19,565
13	anti-tnf.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	40,966
14	adalimumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	57,861
15	infliximab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	82,480
16	etanercept.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	48,691
17	golimumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	12,046
18	certolizumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	11,667
19	anakinra.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	12,441
20	canakinumab.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	6,138
21	rilonacept.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	1,456
22	psoriasis.mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	167,510
23	(hiv or human immunodeficiency virus).mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, bt, nm, ox, px, rx, ui, sy, ux, mx]	992,135
24	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	408,891
25	22 and 23	2,574
26	24 and 25	556
27	limit 26 to english language	521
28	limit 27 to humans	480
29	remove duplicates from 28	415

Supplementary Table 2. Individual features of 39 patients with psoriasis and HIV infection treated with anti-interleukin drugs.

Study	Age/ Sex (n)	Comor- bidities and coinfec- tions (n)	Previous treat- ment for HCV/HB V/TB?	Mean duration of HIV, months	An- tiretrovi- ral regi- men for HIV	Mean dura- tion of psoria- sis (mont hs)	Type of pso- riasis (n)	Prior failed ther- apies for psoriasis (route)	Biologic with re- ported PASI/viral load/CD4 cell values	PASI:(pre- treat- ment)/ (post- treat- ment)	Mean change in PASI from baseline (%)	Viral load: (pre- treat- ment)/(p ost-treat- ment)	CD4 ⁺ cell count: (pre- treat- ment)/ (post- treat- ment)	Treat- ment dura- tion (days): First- line/su bse- quent- line	Grade 1 or grade 2 AEs: First- line (n)/sub se- quent- line (n)	Grade 3 or grade 4 AEs: First- line (n)/sub se- quent- line (n)	Treat- ment discon- tinuation due to AEs (Y/N): First- line/sub- sequent- line	Treat- ment deaths due to AEs (Y/N): First- line/sub- sequent- line
Bardazzi 2017 ¹	53/M	HCV; HCV-re- lated he- patic dis- ease	Y	264	HAART	72	Plaque	CsA	Usteku- numab 45 mg	16.2	-93.80%	NR/NR	523/45 4	90	NR	NR	N	N
Bardazzi 2017 ¹	41/M	None	NR	48	HAART	84	Plaque	CsA	Usteku- numab 45 mg	18.9	-90.50%	NR/NR	537/60 6	90	NR	NR	N	N
Bardazzi 2017 ¹	70/M	Hyper- tension	NR	36	HAART	48	Plaque	CsA	Usteku- numab 45 mg	19	-92.60%	NR/NR	186/33 0	90	NR	NR	N	N
Bardazzi 2017 ¹	43/F	None	NR	36	HAART	72	Plaque	CsA	Usteku- numab 45 mg	17.3	-74%	NR/NR	535/61 0	90	NR	NR	N	N
Bartos 2018 ²	51/M	NR	NR	NR	HAART	NR	Erythro dermic	ACI, apre- milast, pho- totherapy	Guselku- mab 100 mg	NR/NR	NR	NR/NR	NR/Sta ble	180	NR	NR	N	N
Bedier 2023 ³	65/F	HCV; porphyria cutanea tarda; throm- bocyto- penic purpura	Y	NR	HAART	60	Plaque	MTX	Secuki- numab 300 mg	NR/NR	NR	Undetect- able/Un- detecta- ble	1535/1 098	60	NR	NR	N	N

Bernardini 2022 ⁴	30/M	NR	NR	NR	HAART	120	Erythrodermic	CsA, MTX, UVB-NB, Ustekinumab 45 mg	Ixekizumab 80 mg	47/NR	-90%	NR/NR	NR/Stable	180/28	NR/Herpes zoster infection	NR/NR	N/N	N/N
DiLernia 2019 ⁵	48/F	Acute myocardial ischemia; psoriatic arthritis	NR	NR	HAART	240	Plaque	Apremilast, CsA, UVB-NB	Secukinumab 300 mg	10.3/0	-100%	Undetectable/Undetectable	650/1387	35	NR	Candida esophagitis; erosive gastritis	N	N
DiLernia 2020 ⁶	62/M	HBV, HCV	Y	96	HAART	168	Plaque	CsA, UVB-NB, Ustekinumab 45 mg	Brodalumab 210 mg	20/0	-100%	Undetectable/Undetectable	368/Stable	368/42	NR/NR	NR/NR	N/N	N/N
Estevigno 2024 ⁷	34/F	Obesity, dyslipidaemia	Y	NR	NR	NR	plaque	NR	Risankizumab 150 mg	24/0	-100%	1230/undetectable	12/300	56	NR	NR	N	N
Estevigno 2024 ⁷	35/M	-	Y	NR	HAART	NR	Plaque	NR, acitretin	Risankizumab 150 mg	21/0	-100%	Undetectable/undetactable	512/512	56	NR	NR	N	N
Gleason 2023 ⁸	63/M	Metastatic hepatocellular carcinoma	NR	NR	NR	NR	Plaque	TOP	Ixekizumab 80 mg	NR/NR	NR	NR/NR	NR/NR	120	NR	NR	N	N
Gong 2022 ⁹	33/M	Psoriatic arthritis; type 2 diabetes	NR	60	HAART	72	Erythrodermic	ACI, Etanercept 50 mg	Secukinumab 300 mg	20.2/0	-100%	100/Stable	353/327	203	NR	NR	N	N
Maliyar 2023 ¹⁰	36/M	Depression	NR	NR	HAART	NR	Guttate	ACI, apremilast, MTX, phototherapy, Adalimumab 40 mg	Risankizumab 150 mg	5.4/0	-100%	Undetectable/Undetectable	1461/1225	NR/150	NR/NR	NR/NR	N/N	N/N
Maliyar 2023 ¹⁰	58/M	Depression; osteoarthritis; type 2 diabetes	NR	NR	HAART	NR	Plaque	Apremilast, PUV, UVB-NB, Ustekinumab,	Risankizumab 150 mg	4/1.6	-60%	Undetectable/Undetectable	831/926	NR/NR/NR	NR/NR	NR/NR	N/N	N/N

								Guselku- mab 100 mg										
Montes- Torres 2019 ¹¹	46/M	NR	NR	9.5	HAART	31	Plaque	Ada- limumab 40 mg	Ustek- inumab	28/NR	NR	5734845/ 45	1500/1 293	NR/18 3	NR/NR	NR/NR	N/N	N/N
Montes- Torres 2019 ¹¹	50/M	NR	NR	319	HAART	81.5	Plaque	Etanercept 50 mg, Ada- limumab 40 mg	Ustekunumab	NR	PASI 75	Undetect- able	722/87 2	2134	NR	NR	N	N/
Montes- Torres 2019 ¹¹	54/M	HCV	NR	221	HAART	72	Plaque	Etanercept 50 mg, Ada- limumab 40 mg, Ustek- inumab	Ustek- inumab	NR	NR	Undetect- able	350/49 4	1693	NR	NR	N	N
Montes- Torres 2019 ¹¹	54/M	Psoriatic arthritis	NR	156	HAART	192	Plaque	NR	Ustek- inumab	NR/NR	NR	Undetect- able/Un- detecta- ble	555/10 83	294	NR	NR	N	N
Montes- Torres 2019 ¹¹	35/F	Psoriatic arthritis	NR	78	HAART	191	Plaque	NR	Ustek- inumab	29/NR	NR	4165/26	469/36 7	994	NR	NR	N	N
Muñoz 2020 ¹²	42/M	Anxiety; depres- sion; HBV	Y	NR	HAART	NR	Plaque	ACI, CsA, PUVA	Ustek- inumab 45 mg	23/0	-100%	159268/ NR	583/N R	NR	NR	NR	N	N
Myers 2021 ¹³	42/M	NR	NR	NR	HAART	NR	Plaque	Etanercept 50 mg, Ada- limumab 40 mg	Ustek- inumab 90 mg	NR/NR	NR	Undetect- able/Un- detecta- ble	1300/1 652	252/25 2/56	NR/NR /NR	NR/NR /NR	N/N/N	N/N/N
Myers 2021 ¹³	58/M	Alcohol abuse disorder; HBV	Y	NR	None	NR	Plaque	NR	Ustek- inumab 45 mg	NR/NR	NR	51/76	997/10 63	330	NR	NR	N	N
Orsini 2023 ¹⁴	53/M	NR	NR	96	HAART	336	Plaque	NR	Risanki- zumab 150 mg	22/0	-100%	NR/NR	NR/Sta- ble	112	NR	NR	N	N

Orsini 2023 ¹⁴	32/M	NR	NR	36	HAART	36	Plaque	NR	Risanki-zumab 150 mg	30/0	-100%	NR/NR	NR/Stable	112	NR	NR	N	N
Orsini 2023 ¹⁴	58/M	NR	NR	276	HAART	36	Plaque	NR	Risanki-zumab 150 mg	20/1	-95%	Undetectable/Undetectable	439/Stable	112	NR	NR	N	N
Orsini 2023 ¹⁴	52/M	NR	NR	336	HAART	72	Plaque	NR	Risanki-zumab 150 mg	10/0	-100%	Undetectable/Undetectable	NR/Stable	112	NR	NR	N	N
Pangilinan 2020 ¹⁵	60/M	NR	NR	NR	HAART	84	Plaque	ACI	Ixekizumab 80 mg	36/5	-86.10%	20/NR	170/NR	14	NR	NR	N	N
Pangilinan 2020 ¹⁵	31/M	NR	NR	NR	HAART	84	Erythrodermic	NR	Secukinumab 300 mg	24/0	-100%	Undetectable/NR	NR/NR	NR	NR	NR	N	N
Paparizos 2012 ¹⁶	61/M	NR	NR	NR	HAART	420	Plaque	ACI, CsA, MTX, PUVA. Etanercept 50 mg	Ustekinumab 45 mg	11.9/NR	NR	50/20	429/530	NR/126	NR/NR	NR/NR	N/N	N/N
Qin 2022 ¹⁷	50/M	TB	Y	84	HAART	240	Plaque	ACI, phototherapy	Secukinumab 300 mg	15.2/0	-100%	Undetectable/Undetectable	546/873	84	NR	NR	N	N
Rob 2022 ¹⁸	36/M	HCV	Y	NR	HAART	60	Plaque	ACI, apremilast, topical, UVB-NB	Risanki-zumab 150 mg	10.3/0	-100%	NR/Undetectable	NR/630	84	NR	NR	N	N
Romita 2022 ¹⁹	31/M	NR	NR	NR	HAART	120	Plaque	Apremilast	Secukinumab 300 mg	13/0	-100%	NR/NR	1487/NR	35	NR	Genital candidiasis	N	N
Saeki 2015 ²⁰	47/M	NR	NR	NR	HAART	240	Plaque	CsA, etretinate, UVB-NB, Adalimumab 40 mg to 80 mg	Ustekinumab 45 mg	9.7/0.8	-91.80%	20/Stable	755/916	300/120	NR/NR	NR/NR	N/N	N/N

Wang 2019 ²¹	55/M	Kaposi sarcoma	NR	156	NR	360	Plaque	ACI, UVB-NB	Ustekinumab 45 mg	NR/NR	NR	20/Stable	212/316	450	NR	NR	N	N
Xu 2023 ²²	NR/M (7)	NR	NR	NR	HAART (7)	NR	Plaque	NR	Secukinumab 300 mg	NR/NR	-85.7%	NR/NR	NR/NR	365	NR	NR	N	N
Xu 2023 ²²	NR/M (9)	NR	NR	NR	HAART (9)	NR	Plaque	NR	Ustekinumab 45 mg	NR/NR	-88.3%	NR/NR	NR/NR	365	NR	NR	N	N
Xu 2023 ²²	NR/M (7)	NR	NR	NR	HAART (7)	NR	Plaque	NR	Risankizumab 150 mg	NR/NR	-87.9%	NR/NR	NR/NR	365	NR	NR	N	N
This article	64/M	Hypercholesterolemia, hypertension	Y	48	HAART	120	plaque	ACI	Tildrakizumab 200 mg	14.3/0	- 100%	Undetectable/ Undetectable	991/876	369	N	N	N	N

ACI, acitretin; AE, adverse event; CsA, cyclosporine A; F, female; HAART, highly active antiretroviral therapy; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus; M, male; MTX, methotrexate; N, no; NR, none reported; PASI, Psoriasis Area and Severity Index; PASI 75, 75% improvement from baseline in PASI; PUVA, psoralen plus ultraviolet A phototherapy; TB, tuberculosis; TOP, topical; UVB-NB, ultraviolet-B narrowband phototherapy; Y, yes.

Data taken from Estevigno 2024 and Sood 2024.

References

1. Bardazzi F, Magnano M, Campanati A, et al. Biologic Therapies in HIV-infected Patients with Psoriasis: An Italian Experience. *Acta Derm Venereol* 2017;97:989-90.
2. Bartos G, Cline A, Beroukhim K, et al. Current biological therapies for use in HIV-positive patients with psoriasis: case report of gesulkumab used and review. *Dermatol Online J* 2018;24:13030/qt3db748cg.
3. Bedier H, Isnard S, Thomas R, Routy JP. Control of porphyria cutanea tarda with anti-IL-17 secukinumab in a person with psoriasis living with HIV. *Oxf Med Case Reports* 2023;2023:omad066.
4. Bernardini N, Skroza N, Tolino E, et al. HIV positive patient treated with ixekizumab. *Clin Ter* 2022;173:195-197.
5. Di Lernia V, Casanova DM, Garlassi E. Secukinumab in an HIV-positive patient with psoriasis. *J Dtsch Dermatol Ges* 2019;17:646-8.
6. Di Lernia V, Casanova DM, Ricci C. Brodalumab: another helpful option for HIV-positive psoriatic patients? *Dermatol Ther* 2020;33:e13895.
7. Estevinho T, Freitas E, Torres T. Risankizumab, a therapeutic alternative for psoriasis in people living with HIV. *J Int Med Res* 2024;52:3000605241229324.
8. Gleason L, Hunter E, Cohen A, et al. Atezolizumab-induced psoriasiform drug eruption successfully treated with ixekizumab: a case report and literature review. *Dermatol Online J* 2023;29:10.5070/D329160215.
9. Gong J, Wu W, Qiu L, et al. Interleukin-17A inhibitor secukinumab treatment in HIV-positive psoriasis patient: a case report. *Clin Cosmet Investig Dermatol* 2022;15:2949-56.
10. Maliyar K, Lansang P, Doiron P. Use of risankizumab in two HIV-positive patients with psoriasis. *JAAD Case Rep* 2023;33:54-5.

11. Montes-Torres A, Aparicio G, Rivera R, et al. Safety and effectiveness of conventional systemic therapy and biological drugs in patients with moderate to severe psoriasis and HIV infection: a retrospective multicenter study. *J Dermatolog Treat* 2019;30:461-5.
12. Muñoz LC, Muñoz JP, Taboada AC, et al. Human immunodeficiency virus infection in a hepatitis B virus-positive psoriasis patient treated with ustekinumab. *Cutis* 2020;105:E31-2.
13. Myers B, Thibodeaux Q, Reddy V, et al. Biologic Treatment of 4 HIV-Positive Patients: A Case Series and Literature Review. *J Psoriasis Psoriatic Arthritis* 2021;6:19-26.
14. Orsini D, Maramao FS, Gargiulo L, et al. Effectiveness and safety of risankizumab in HIV patients with psoriasis: A case series. *Int J STD AIDS* 2024;35:67-70.
15. Pangilinan MCG, Sermswan P, Asawanonda P. Use of Anti-IL-17 Monoclonal Antibodies in HIV Patients with Erythrodermic Psoriasis. *Case Rep Dermatol* 2020;12:132-7.
16. Paparizos V, Rallis E, Kirsten L, Kyriakis K. Ustekinumab for the treatment of HIV psoriasis. *J Dermatolog Treat* 2012;23:398-9.
17. Qin H, Lu J, Yi X, et al. Secukinumab treatment for a psoriasis patient co-infected with HIV and latent tuberculosis: A case report. *J Dermatol* 2022;49:e415-6.
18. Rob F, Rozsypal H. Successful treatment of psoriasis with risankizumab in an HIV positive patient with sexually transmitted infection comorbidities. *Dermatol Ther* 2022;35:e15277.
19. Romita P, Foti C, Calianno G, Chiricozzi A. Successful treatment with secukinumab in an HIV-positive psoriatic patient after failure of apremilast. *Dermatol Ther* 2022;35:e15610.
20. Saeki H, Ito T, Hayashi M, et al. Successful treatment of ustekinumab in a severe psoriasis patient with human immunodeficiency virus infection. *J Eur Acad Dermatol Venereol* 2015;29:1653-5.

21. Wang DM, Fernandez AP, Calabrese CM, Calabrese LH. Treatment of psoriasis with ustekinumab in a patient with HIV-related Kaposi sarcoma. Clin Exp Dermatol 2019;44:113-5.
22. Xu J, Gill K, Flora A, et al. The impact of psoriasis biologic therapy on HIV viral load and CD4⁺ cell counts in HIV-positive individuals: A real-world cohort study. J Eur Acad Dermatol Venereol 2023.