Short Term Efficacy of Biological Treatment for Moderate-to-Severe Plaque Psoriasis: A Systematic Review and Network Meta-Analysis

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Introduction

Psoriasis is a common chronic inflammatory skin disease that has multiple variants and may present with various manifestations[1,2]. While mortality due to psoriasis is rare[3,4], it highly impacts the lives of the patients from disfigurement to disablement[2].

The introduction of biologic agents has revolutionized psoriasis management. Examples of biologics used are inhibitors of (TNFα) [5] , (IL-17A) [6], (IL-23) [7] .The aim of this study is to summarize the existing evidence regarding FDA-approved biologics for the treatment of psoriasis.

Materials and methods

PubMed, Scopus, and Clinicaltrials.gov were searched thoroughly

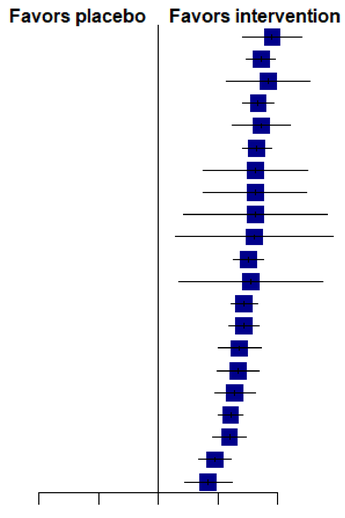
The eligibility criteria for inclusion were:
1.Patients who have moderate to severe psoriasis
2.FDA approved biological agents
3.Reported PASI75, PASI90, PASI100, IGA, PGA, DLQI, or number of withdrawals due to adverse events
4.Blinded randomized clinical trials

The outcomes (PASI75, PASI90, PASI100, IGA, PGA, and number of withdrawals) were presented as relative risk (RR) with the corresponding 95% confidence interval (95% CI), while the change in DLQI was presented as standardized mean difference (SMD) with its 95% confidence interval.

The data analysis was conducted using the package "netmeta"[22] in R 4.3.1. The risk of bias was assessed using the Cochrane Risk of Bias tool.
The certainty of evidence was assessed by following the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) guidelines

Results

treat	RR	95% CI	P-score
Brodalumab - 210mg Q2W	81.04	[26.16; 251.01]	0.86
Ixekizumab - 80mg Q2W	52.89	[30.15; 92.78]	0.80
Bimekizumab - 320mg Q4W	69.53	[14.13; 342.16]	0.78
Ixekizumab - 160mg Q4W	47.45	[26.21; 85.89]	0.74
Brodalumab - 140mg Q2W	52.80	[17.01; 163.86]	0.72
Ixekizumab - 80mg Q4W	44.89	[25.50; 79.03]	0.70
Ustekinumab - 90mg at weeks 0,4	42.68	[5.74; 317.58]	0.63
Ustekinumab - 45mg at weeks 0,4	42.03	[5.70; 309.62]	0.62
Guselkumab - 50mg at weeks 0,4,8	42.34	[2.62; 684.38]	0.61
Infliximab - 5mg/kg at weeks 0,2,6	40.79	[1.94; 859.73]	0.59
Guselkumab - 100mg at weeks 0,4	31.96	[17.95; 56.90]	0.57
Guselkumab - 100mg at weeks 0,4,8	35.55	[2.18; 578.63]	0.55
Risankizumab - 150mg at weeks 0,4	27.59	[16.68; 45.64]	0.50
Secukinumab - 300mg Q4W	26.69	[14.90; 47.83]	0.47
Tildrakizumab - 100mg at weeks 0,4	22.79	[10.00; 51.97]	0.41
Tildrakizumab - 200mg at weeks 0,4	21.71	[9.50; 49.58]	0.38
Risankizumab - 75mg at weeks 0,4	19.22	[8.86; 41.68]	0.34
Adalimumab - 40mg Q2W	16.30	[10.01; 26.54]	0.27
Secukinumab - 150mg Q4W	15.59	[8.11; 29.96]	0.25
Etanercept - 50mg BIW	8.85	[4.76; 16.48]	0.11
Methotrexate	6.92	[2.78; 17.22]	0.09



Heterogeneity: χ^2_{20} = 48.15 (P < .001), I^2 = 58%

All the included interventions were more effective than placebo in achieving all the outcomes sought in this study except for Etanercept 25mg weekly, which showed little or no difference from placebo in achieving PASI90 (Moderate certainty). In this network meta-analysis, Brodalumab 210mg every two weeks and Ixekizumab 80mg every two weeks were the best in achieving 100% reduction on the PASI scale compared to placebo. Higher doses of Infliximab (Infliximab 5mg/kg and 10mg/kg given at weeks 0, 2, and 6) was superior to the other anti-TNFα in the PASI75 outcome while Infliximab was the best in achieving PASI75 and DLQI.
On the other hand, only two interventions proved to be different from placebo in terms of number of withdrawals due to adverse events, Risankizumab 150mg given twice four weeks apart and Ustekinumab 90mg given twice four weeks apart, which had lower risk of withdrawals (High certainty), while the other interventions had little or no difference in comparison to placebo. Guselkumab 100mg given twice 4 weeks apart and Secukinumab 300mg every 4 weeks are among the most effective antibodies in achieving an IGA of 0 or 1 (26.62, [17.91 To 39.56], Moderate certainty and 23.45, [15.85 To 34.70], High certainty).
The largest reported outcome was PASI75 with 72 trials encompassing 34 different drugs and regimens. In comparison, IGA and DLQI were reported by 16 and 29 trials, respectively, encompassing only 10 and 23 drug regimens, respectively.

Conclusions

Our findings underscore the importance of avoiding certain regimens, such as Etanercept 25mg weekly, due to their limited efficacy. Additionally, we highlight the superior performance of specific interventions, such as higher doses of Infliximab and certain anti-IL 17 agents, in achieving desired outcomes. By analyzing each dosage form separately, we aimed for higher accuracy and lower heterogeneity, revealing significant differences among interventions.

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Further information

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