

Biosimilars in treatment of rheumatoid arthritis: a Pharmacoeconomic study

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Abstract

Objective and Introduction: A wide variety of treatment options have become available for rheumatoid arthritis. Biosimilars are highly effective in treating rheumatoid arthritis but are rarely considered as first line therapy because of their high cost. This study evaluates cost effectiveness and affordability of various biosimilars available in market for rheumatoid arthritis.

Methodology: Three biosimilars Adalimumab, Infliximab and Etanercept were compared in this study. Weighted average of proportion of patients achieving ACR (American College of Rheumatology) 20, ACR 50 and ACR 70 were considered as measure of outcome from published clinical trials. The data related to the cost of the drugs has been collected from authenticated sources and cost effectiveness was calculated. Affordability is analysed comparing the price of drug and daily wage of an unskilled labour. The data related to daily wage of unskilled labour has been collected from the authenticated sources.

Results: In this analysis we found that Etanercept was cost effective, it costs 2,42,000 for 78.6% patients achieving ACR 20, 50.5% patients achieving ACR 50 and 25.5% patients achieving ACR 70. The next least expensive option is Infliximab costing 2,97,000 for 76.1% patients achieving ACR 20, 57.63% patients achieving ACR 50 and 29% patients achieving ACR 70. Adalimumab is the expensive option costing 6,00,00 which is least effective when compared with the two options. It takes 691 days for an unskilled daily wager to afford etanercept to achieve above mentioned outcome. It takes 849 days wage of an unskilled daily wager to afford infliximab to achieve above mentioned outcome. It takes 1714 days wage of an unskilled daily wager to afford adalimumab to achieve above mentioned outcome.

Conclusion: Our analysis indicates that Etanercept 25mg twice weekly is cost effective for achieving ACR20, ACR 50 and ACR 70 over a period of 22 weeks. Even though all these drugs are highly effective in the treatment of rheumatoid arthritis they are beyond the affordability of common man. The government of India should take effective measures to bring these drugs under DPCO regulation.

Keywords: Biosimilars, Rheumatoid arthritis, Pharmacoeconomic study

Introduction

Rheumatoid arthritis (RA) is an autoimmune disease in which the body’s immune system – which normally protects its health by attacking foreign substances like bacteria and viruses – mistakenly attacks the joints. This creates inflammation that causes the tissue that lines the inside of joints (the synovium) to thicken, resulting in swelling and pain in and around the joints. The synovium makes a fluid that lubricates joints and helps them move smoothly. If inflammation goes unchecked, it can damage cartilage, the elastic tissue that covers the ends of bones in a joint, as well as the bones themselves.

A wide variety of treatment options have become available for rheumatoid arthritis. Biosimilars are highly effective in treating rheumatoid arthritis but are rarely considered as first line therapy adalimumab, etanercept and infliximab are the biosimilars which are effective treatment for patients who are not well controlled by conventional DMARDs, improving control of symptoms, improving physical functions and slowing radiographic changes in joints.

Background

Biosimilars are effective in treating rheumatoid arthritis for patients who are not well controlled by conventional DMARDs but the cost of these drugs are beyond the affordability

Methodology

Three biosimilars Adalimumab, Infliximab and Etanercept were compared in this study. Weighted average of proportion of patients achieving ACR (American College of Rheumatology) 20, ACR 50 and ACR 70 were considered as measure of outcome from published clinical trials. The data related to the cost of the drugs has been collected from authenticated sources and cost effectiveness was calculated. Affordability is analysed comparing the

price of drug with daily wage of an unskilled labour. The data related to daily wage of unskilled labour has been collected from the authenticated sources.

Results

In this analysis we found that Etanercept was cost effective, it costs 2,42,000 for 78.6% patients achieving ACR 20, 50.5% patients achieving ACR 50 and 25.5% patients achieving ACR 70.

The next least expensive option is Infliximab costing 2,97,000 for 76.1% patients achieving ACR 20, 57.63% patients achieving ACR 50 and 29% patients achieving ACR 70.

Adalimumab is the expensive option costing 6,00,00 which is least effective when compared with the two options.



Figure 1: Showing ACR of various biosimilars in rheumatoid arthritis.

ACR 20 Response: A measure based on American College of Rheumatology criteria—of at least a 20% improvement in the number of tender and swollen joints, and a 20% improvement in at least 3 of the following: the patient’s global assessment of disease status; the patient’s assessment of pain; the patient’s assessment of function measured using the Stanford Health Assessment Questionnaire; the physician’s global assessment of disease status; serum C-reactive protein levels.

ACR 50 Response: A measure based on American College of Rheumatology criteria of at least a 50% improvement in the number of tender and swollen joints, and a 50% improvement in at least 3 of the following: the patient’s global assessment of disease status; the patient’s assessment of pain; the patient’s assessment of function measured using the Stanford Health Assessment Questionnaire; the physician’s global assessment of disease status; serum C-reactive protein levels.

ACR 70 Response: A measure based on American College of Rheumatology criteria of at least a 70% improvement in the number of tender and swollen joints, and a 20% improvement in at least 3 of the following: the patient’s global assessment of disease status; the patient’s assessment of pain; the patient’s assessment of function measured using the Stanford Health Assessment Questionnaire; the physician’s global assessment of disease status; serum C-reactive protein levels.

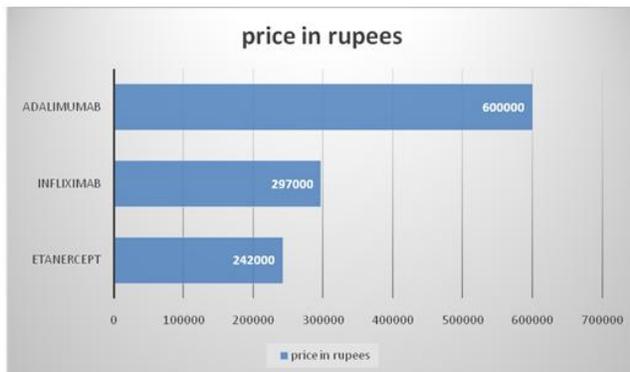


Figure 2: Showing price of various biosimilars used in rheumatoid arthritis.

Table 1: Showing the affordability of the biosimilars considering the minimum wage of an unskilled daily wagger.

Drugs	Price in rupees	Affordability
Etanercept	242000	691 days
Infliximab	297000	849 days
Adalimumab	600000	1714 days

It takes 691 days for an unskilled daily wagger to afford etanercept to achieve above mentioned outcome. It takes 849 days wage of an unskilled daily wagger to afford infliximab to achieve above mentioned outcome. It takes 1714 days wage of an unskilled daily wagger to afford adalimumab to achieve above mentioned outcome.

Conclusion

Our analysis indicates that Etanercept 25mg twice weekly is the least expensive option of biosimilar for achieving ACR20, ACR 50 and ACR 70 over a period of 22 weeks. Even though all these drugs are highly effective in the treatment of rheumatoid arthritis they are beyond the affordability of common man. Government of India should take effective measures to bring these lifesaving drugs under the DPCO regulation and make them affordable for all the socio-economic classes.

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