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A review on Comparision of efficacy and safety of Tofacitinib and Methotrexate in patients with Rhematoid arthritis

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Abstract

Chronic autoimmune disease known as rheumatoid arthritis (RA) mostly affects synovial joints, causing discomfort, inflammation, and maybe even joint damage. The effectiveness and safety of methotrexate, a traditional disease-modifying antirheumatic medication (DMARD), and tofacitinib, an oral Janus kinase (JAK) inhibitor, in the treatment of RA are thoroughly compared in this study. They are assessed for their effect on disease activity, patient-reported outcomes, and radiographic development of joint damage using data from clinical trials, meta-analyses, and real-world investigations.

Because of its proven effectiveness in reducing disease activity and its good safety profile when used for an extended period of time, methotrexate has been the mainstay of therapy for RA. On the other hand, tofacitinib has a unique mode of action that may enable patients to experience immediate symptom alleviation and an improvement in their quality of life. However, because of the increased risk of some adverse effects, including as infections and raised cholesterol, its safety profile needs to be carefully considered.

Compared to methotrexate, the review shows that tofacitinib can significantly enhance disease control and patient satisfaction; nonetheless, it requires close monitoring for side effects. Particularly for the long-term management of RA, methotrexate is still a dependable and well-tolerated treatment choice.

In order to help physicians in making well-informed decisions for individualized RA care, this thorough comparison attempts to provide them with nuanced insights into the therapeutic advantages and dangers associated with both drugs. To improve treatment strategies and maximize results for RA patients, more investigation and long-term studies are necessary. The results highlight the significance of selecting RA treatments that strike a balance between safety and effectiveness.

Keywords: Rheumatoid Arthritis (RA), Methotrexate,Tofacitinib, Efficacy, Safety

Introduction

The chronic, systemic autoimmune illness known as rheumatoid arthritis (RA) mostly affects synovial joints. It is typified by joint destruction, inflammation, and a host of other systemic symptoms that can seriously lower someone's quality of life. Investigating the epidemiology, pathophysiology, symptoms, diagnosis, and therapy options of RA is necessary to comprehend the condition.[1,2]

Epidemiology

About 1% of people worldwide suffer from epidemiology RA, which is more common in women than in males, usually at a 3:1 ratio. Though it can strike at any age, the condition often manifests itself in people between the ages of 30 and 60. The prevalence of RA varies by region and ethnicity; greater rates have been seen in some Native American communities and lower rates in some Asian nations.Although the precise reason of these variances is unknown, a mix of environmental and genetic variables is probably at play.[3,4]

Pathogenesis

A complicated interaction between immune system dysregulation, environmental stressors, and genetic predisposition leads to the development of RA. Important facets of RA pathogenesis consist of:

1. **Genetic Factors**: There is a high correlation between certain genetic markers, especially HLA-DRB1 alleles, and an increased risk of developing RA. The risk of the illness is also influenced by other genes related to immune control.
2. **Environmental Triggers**: In people who are genetically susceptible to RA, environmental factors including smoking, infections, and specific occupational exposures can cause the disease to develop. The most well-known environmental risk factor is smoking.
3. **Immune Dysregulation**: Autoreactive T cells, B cells, and macrophages play important roles in the immune system's activation, which is the first stage of the disease. These immune cells cause chronic inflammation and synovitis (inflammation of the synovial membrane) by producing pro-inflammatory cytokines such as TNF-α, IL-6, and IL-1. Joint abnormalities result from the inflammation's gradual deterioration of bone and cartilage.[5,6]

Symptoms

RA typically manifests with:

1. **Joint Symptoms**: One of the main signs of symmetrical polyarthritis is that it affects both sides of the body's joints. The little joints of the hands, wrists, and feet are frequently impacted. Pain, edema, and stiffness are the main symptoms, especially in the morning or after prolonged periods of inactivity (morning stiffness lasting more than an hour).
2. **Systemic Symptoms**: Fatigue, fever, and weight loss are among the symptoms of RA. In addition to causing extra-articular symptoms such rheumatoid nodules, lung illness, cardiovascular problems, and ocular inflammation, systemic inflammation can also include other organs.
3. **Joint Deformities**: Untreated or insufficiently managed RA can cause joint deformities and function loss as the illness advances.[7,8]

Diagnosis

Imaging scans, laboratory testing, and clinical evaluations are all used in the diagnosis of RA

1. **Clinical Evaluation**: The clinical evaluation involves determining the length of morning stiffness, joint involvement, and symptoms.
2. **Lab testing**: Blood testing are necessary to get a diagnosis. Patients with RA frequently have high levels of rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPAs). Active inflammation is indicated by elevated inflammatory markers such as

C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR).

3. **Imaging Studies**: To evaluate joint inflammation and damage, MRIs, ultrasounds, and X-rays are utilized. Imaging may reveal joint effusions and soft tissue edema early in the illness. Joint space erosions and narrowing become noticeable as RA worsens.[9,10]

Treatment

The main objectives of RA treatment are to reduce inflammation, ease symptoms, shield the joints from harm, and enhance quality of life. Among the treatment methods are:

Medicinal Interventions:

- NSAIDs, or nonsteroidal anti-inflammatory drugs: Assist in alleviating symptoms by decreasing discomfort and swelling.
- Corticosteroids: Used to temporarily reduce inflammation and severe symptoms.
- Standard DMARDs: Because it is so effective at lowering disease activity and delaying progression, methotrexate is the cornerstone. Sulfasalazine, Hydroxychloroquine, and Leflunomide are a few other DMARDs.
- Biologic DMARDs: These comprise B-cell depleting drugs (like Rituximab), IL-6 inhibitors (like Tocilizumab), and TNF inhibitors (like Etanercept, Infliximab). To lessen inflammation, they concentrate on particular immune system elements.
- Targeted Synthetic DMARDs: Two examples of drugs that block the inflammatory process's Janus kinase (JAK) pathways are tofacitinib and baricitinib.

Non-Pharmacological Treatments:

- Physical Therapy: Promotes the preservation of joint mobility and function.
- Occupational therapy helps patients maximize their everyday activities and adjust to their physical limits.
- Lifestyle Changes: To enhance general health and lower inflammation, adopt a balanced diet, quit smoking, and engage in regular exercise.
- Surgical Procedures: Surgical procedures such joint replacement or synovectomy may be taken into consideration in situations of severe joint injury.[11,12]

Comparision of efficacy and safety of Tofacitinib and Methotrexate in patients with Rhematoid arthritis

Methotrexate and Tofacitinib are important medications used in the treatment of rheumatoid arthritis (RA), each with its own advantages and disadvantages. Owing to its shown effectiveness, long-term safety record, and affordability, methotrexate—often referred to as the cornerstone therapy—is routinely recommended as a first-line treatment. It functions as a cornerstone in the management of RA by efficiently regulating disease activity and gradually reducing joint degeneration over time. It can be used as monotherapy or in conjunction with other disease-modifying antirheumatic medications (DMARDs).[13,14]

Tofacitinib, on the other hand, is a more focused therapy strategy that is especially helpful for individuals who have not reacted well to methotrexate or other traditional DMARDs. By blocking intracellular signaling pathways implicated in inflammation, tofacitinib, a Janus kinase (JAK) inhibitor, offers quick symptom alleviation and better patient-reported outcomes. Because of its well-established track record, methotrexate is frequently chosen as the first treatment; however, tofacitinib provides a useful substitute for individuals who need a more aggressive approach or who are having unbearable side effects from methotrexate.[15,16]

The final decision between methotrexate and tofacitinib is based on the characteristics of each patient, the severity of the disease, the intended course of treatment, and any possible hazards or advantages.

In rheumatology, there is a lot of interest in comparing the safety and effectiveness of methotrexate with tacitinib in patients with RA. Disease-modifying antirheumatic medications (DMARDs) such as methotrexate and tofacitinib are frequently used to treat RA, although they have different modes of action and possible adverse effects.[17,18]

Tofacitinib

Mechanism of Action:

A Janus kinase (JAK) inhibitor called tofacitinib targets the Signal Transducer and Activator of Transcription (JAK-STAT) signaling pathway. This pathway is involved in the signaling of many cytokines that cause inflammation and is essential for the control of immune responses

1. **JAK Inhibition**: Tofacitinib selectively blocks JAK1, JAK3, and JAK2 to a lesser degree. JAK enzymes are intracellular tyrosine kinases that influence gene expression and immune cell activation by sending signals from cytokine receptors on the cell surface to the nucleus.
2. **Blocking Cytokine Signaling**: Tofacitinib stops the phosphorylation and activation of STAT proteins by blocking JAKs. The signaling pathways of numerous important pro-inflammatory cytokines, including IL-6, IL-2, IL-4, and IFN-γ, are disrupted by this suppression.
3. **Reduction of Inflammation**: When cytokine signaling is blocked, inflammatory mediators are produced and activated less frequently. As a result, there is a decrease in inflammation and synovial proliferation, and RA symptoms are lessened.
4. **Impact on Immune Cells**: Tofacitinib modifies the activity of T and B cells, two immune cell types that are essential to the autoimmune reaction associated with RA.[19,20,21]

Methotrexate

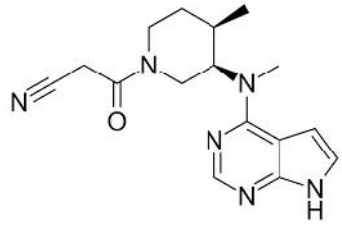
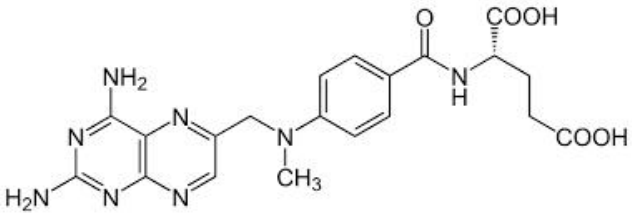
Mechanism of Action:

The traditional disease-modifying antirheumatic medication (DMARD) methotrexate works in several ways, but mostly by blocking the production of folate, which is necessary for DNA synthesis and cell division.

1. **Inhibition of Dihydrofolate Reductase (DHFR)**: The enzyme DHFR, which converts dihydrofolate to tetrahydrofolate, is competitively inhibited by methotrexate. The building components of DNA and RNA, purines and pyrimidines, require tetrahydrofolate to be synthesized.
2. **Reduction of Immune Cell Proliferation**: Methotrexate inhibits DHFR, which interferes with DNA synthesis and cell proliferation. This is especially noticeable for quickly dividing cells, such as activated immune cells (including T and B lymphocytes), which are what cause inflammation in RA.
3. **Adenosine Accumulation**: Another anti-inflammatory mediator that methotrexate encourages the production of is adenosine. By inhibiting the inflammatory response through certain receptors, adenosine lowers the levels of pro-inflammatory cytokines such as TNF-α, IL-6, and IL-1.
4. **Immunosuppressive Effects**: By preventing the growth of immune cells and the generation of cytokines, RA-related chronic inflammation and joint injury are lessened overall.
5. **Inhibition of Polyamines**: Another way that methotrexate reduces inflammation and suppresses the immune system is by preventing the synthesis of polyamines, which are important for cell division and proliferation.[22,23,24]

Mechanism of Action	Tofacitinib	Methotrexate
Target	Janus kinase (JAK) inhibitor	Dihydrofolate reductase (DHFR) inhibitor
Inhibition	Blocks JAK1 and JAK3	Inhibits DHFR
Pathway affected	JAK-STAT signaling pathway	Folate pathway
Effect	Reduces cytokine signaling and inflammation	Inhibits DNA synthesis and cell proliferation
Impact on Immune Cells	Modulates T and B cell function	Suppresses overall immune activity
Additional Effects	-	Increases adenosine release (anti-inflammatory) and Inhibits polyamine synthesis (anti-inflammatory)

Chemical structure[25,26]

Property	Tofacitinib	Methotrexate
Chemical Structure		
Molecular Formula	C16H20N6O	C20H22N8O5
Molecular Weight	312.37 g/mol	454.44 g/mol
Class	Janus kinase (JAK) inhibitor	Folate antagonist (DHFR inhibitor)

Pharmacokinetics[27,28]

Property	Tofacitinib	Methotrexate
Administration	Oral	Oral, Intravenous, Subcutaneous
Absorption	Rapidly absorbed, bioavailability ~74-95%	Well-absorbed, bioavailability ~60-90%
Peak Plasma Concentration	1-2 hours	1-2 hours
Distribution	High volume of distribution (~87 L)	Wide distribution into tissues and intracellular compartments
Protein Binding	Highly protein-bound (≥ 99.7%)	~50%
Metabolism	Extensively metabolized by the liver	Hepatic metabolism (predominantly by DHFR)
Metabolites	Multiple metabolites, primarily mediated by CYP3A4	Polyglutamated metabolites and others
Elimination	Renal (30-40%) and fecal (50-60%) excretion	Renal (~90%) and biliary excretion
Half-life	Approximately 3 hours	3-10 hours (dependent on dose and route of administration)
Clearance	Clearance is primarily renal (~30-40%)	Clearance is predominantly renal (~90%)

Efficacy profile

The effectiveness profiles of methotrexate and tofacitinib in the treatment of rheumatoid arthritis are compared in this table, which also highlights how these drugs affect disease activity, symptom relief, physical function, radiographic progression, patient-reported outcomes, time to onset of action, maintenance of remission, and efficacy in patients who have not taken DMARDs.[29,30]

Efficacy Parameter	Tofacitinib	Methotrexate
Disease Activity	Rapid reduction in disease activity	Reduction in disease activity
Symptoms Relief	Rapid relief of RA symptoms	Relief of RA symptoms
Physical Function	Improvement in physical function	Improvement in physical function
Radiographic Progression	Inhibition of radiographic progression	Inhibition of radiographic progression
Patient-Reported Outcomes	Improvement in patient-reported outcomes	Improvement in patient-reported outcomes
Time to Onset of Action	Rapid onset of action within weeks	Gradual onset of action over several weeks
Maintenance of Remission	Maintenance of disease remission over extended periods	Maintenance of disease remission over extended periods
Effectiveness in DMARD-Naive Patients	Effective as monotherapy or combination therapy	Often used as first-line monotherapy or in combination with other DMARDs

Safety profile

In treating rheumatoid arthritis, this table compares the safety profiles of methotrexate and tofacitinib, emphasizing how each drug affects common side effects such as gastrointestinal, hepatic, hematologic, infectious, cardiovascular, renal, respiratory, and dermatologic.[31,32]

Safety Parameter	Tofacitinib	Methotrexate
Gastrointestinal Effects	Diarrhea, nausea, abdominal pain	Nausea, vomiting, stomatitis, gastrointestinal ulceration
Hepatic Effects	Transaminase elevations, hepatotoxicity	Transaminase elevations, hepatotoxicity
Hematologic Effects	Anemia, lymphopenia, neutropenia	Bone marrow suppression, leukopenia, anemia
Infections	Increased risk of serious infections	Increased risk of infections, including opportunistic infections
Cardiovascular Effects	Increased risk of cardiovascular events	Potential for exacerbation of pre-existing cardiovascular conditions
Renal Effects	Renal impairment, acute kidney injury	Nephrotoxicity, renal impairment
Respiratory Effects	Increased risk of respiratory infections	Potential for pulmonary toxicity
Dermatologic Effects	Rash, dermatitis, pruritus	Photosensitivity reactions, alopecia
Malignancy	Increased risk of lymphoma and other malignancies	Long-term use associated with increased risk of lymphoma, skin cancer
Lipid Effects	Elevated lipid levels	Potential for dyslipidemia
Other Common Side Effects	Headache, hypertension, increased creatinine levels	Fatigue, headach

Monitoring and administration

The monitoring and administration guidelines for methotrexate and tofacitinib in the treatment of rheumatoid arthritis are compared in this table. It includes information on recommended starting doses, titration plans, monitoring parameters, contraindications, and special populations to be aware of, such as those with hepatic or renal impairment.[33,34]

Parameter	Tofacitinib	Methotrexate
Administration	Oral	Oral, Intravenous, Subcutaneous
Starting Dose	5 mg twice daily for most indications	Typically 7.5-10 mg once weekly for RA
Titration	Consider dose reduction to 5 mg once daily in patients with certain comorbidities or risk factors	Adjusted based on patient response and tolerance
Monitoring	Periodic assessment of liver function tests (LFTs), lipid levels, renal function, blood counts, and signs of infection	Monitoring of liver function tests (LFTs), complete blood count (CBC), renal function, and signs of infection
Vaccinations	Recommended to bring vaccinations up to date prior to starting treatment, avoid live vaccines during treatment	Recommended to be up to date with vaccinations, avoid live vaccines during treatment
Contraindications	Hypersensitivity, severe hepatic impairment, active serious infections, lymphoma, severe neutropenia	Hypersensitivity, pregnancy, breastfeeding, severe hepatic or renal impairment, active infection
Special Populations	Caution in patients with a history of chronic or recurrent infections, cardiovascular risk factors, and those receiving concomitant immunosuppressive therapy	Caution in patients with hepatic or renal impairment, immunosuppression, or active infections
Renal Impairment	Use with caution; dose adjustments may be necessary in patients with moderate to severe renal impairment	Use with caution; dose adjustments may be necessary in patients with impaired renal function
Hepatic Impairment	Use with caution; dose adjustments may be necessary in patients with moderate to severe hepatic impairment	Use with caution; contraindicated in severe hepatic impairment

Cost and accessibility

The cost and accessibility of methotrexate and tofacitinib for the treatment of rheumatoid arthritis are compared in this table, which also shows the variations between the two medications in terms of accessibility, patient support programs, cost, insurance coverage, and formulations.[35,36]

Parameter	Tofacitinib	Methotrexate
Cost	Generally higher cost due to being a newer, patented drug	Lower cost due to generic availability
Insurance Coverage	Coverage may vary depending on insurance provider	Often covered by insurance due to its status as a generic drug
Patient Assistance Programs	Manufacturer-sponsored programs may provide financial assistance to eligible patients	Some pharmaceutical companies offer patient assistance programs for Methotrexate, and it is also available in generic form, which may reduce out-of-pocket costs
Accessibility	Availability may be limited in some regions	Widely available, including generic versions
Formulations	Available in tablet and extended-release tablet formulations	Available in tablet, injection, and oral solution formulations

Clinical practice

This table presents a comparative analysis of the clinical practice of using methotrexate and tofacitinib to treat rheumatoid arthritis. It highlights the differences between the two drugs in terms of monitoring needs, special considerations, rapid symptom relief, maintenance therapy, and first-line therapy.[37,38]

Parameter	Tofacitinib	Methotrexate
First-Line Therapy	Generally used as second-line therapy for patients who have had an inadequate response to Methotrexate or other conventional DMARDs	Frequently recommended as first-line therapy due to its established efficacy, safety profile, and cost-effectiveness
Monotherapy or Combination Therapy	Can be used as monotherapy or in combination with Methotrexate or other DMARDs, depending on disease severity and treatment response	Can be used as monotherapy or in combination with other DMARDs, including biologic DMARDs
Rapid Symptom Relief	Provides rapid relief of RA symptoms and improvement in patient-reported outcomes	Provides gradual symptom relief over several weeks
Maintenance Therapy	Effective for long-term disease control and maintenance of remission	Often used for long-term management of RA, as it effectively controls disease activity and slows joint damage over time
Monitoring	Requires periodic monitoring of liver function tests (LFTs), lipid levels, renal function, blood counts, and signs of infection	Requires monitoring of liver function tests (LFTs), complete blood count (CBC), renal function, and signs of infection
Special Considerations	Caution in patients with a history of chronic or recurrent infections, cardiovascular risk factors, and those receiving concomitant immunosuppressive therapy	Caution in patients with hepatic or renal impairment, immunosuppression, or active infections

Outcomes

The detailed long-term results of methotrexate and tofacitinib in patients with rheumatoid arthritis are compared in this table, which also highlights the safety profile, long-term drug survival rates, improvement in physical function and patient-reported outcomes, inhibition of radiographic progression, effectiveness in controlling the disease, and slowing joint damage.[39,40]

Outcome	Tofacitinib	Methotrexate
Disease Control	Effective for long-term disease control and maintenance of remission	Effective for long-term disease control and maintenance of remission
Radiographic Progression	Inhibition of radiographic progression over extended periods	Inhibition of radiographic progression over extended periods
Physical Function	Sustained improvement in physical function over time	Sustained improvement in physical function over time
Patient-reported Outcomes	Sustained improvement in patient-reported outcomes, including pain, fatigue, and quality of life	Sustained improvement in patient-reported outcomes, including pain, fatigue, and quality of life
Joint Damage	Slowing of joint damage progression over extended periods	Slowing of joint damage progression over extended periods
Safety	Generally well-tolerated with long-term use, but continued monitoring for adverse events is necessary	Generally well-tolerated with long-term use, but continued monitoring for adverse events is necessary
Drug Survival	Reasonable long-term drug survival rates	Reasonable long-term drug survival rates

Advantages and Disadvantages

Tofacitinib:

Advantages:

1. **Quick Onset of Action**: Tofacitinib acts more quickly than conventional DMARDs such as methotrexate, which results in RA symptoms being relieved more quickly.
2. **Effective as Monotherapy**: Tofacitinib offers a range of therapeutic choices by acting as either a monotherapy or in conjunction with Methotrexate.
3. **Enhanced Physical Function**: Tofacitinib has been demonstrated in clinical trials to considerably enhance physical function and lessen disability in RA patients.
4. **Alternative for Non-Responders**: It provides patients with a different course of treatment if they don't get the desired results with methotrexate or other traditional DMARDs.
5. **Oral Administration**: Tofacitinib is administered orally, which some patients may find more convenient than injectable drugs.

Disadvantages:

1. **Safety Concerns**: Tofacitinib should be closely monitored for side effects due to its associations with an increased risk of severe infections, high cholesterol levels, and gastrointestinal perforations.
2. **Higher Cost:** Tofacitinib is more expensive than methotrexate, which may prevent some patients or healthcare systems from using it.

3. **Limited Long-Term Data**: Tofacitinib's long-term safety and effectiveness data are still developing, and further study is required to completely comprehend its advantages and disadvantages over long time periods.[41,42]

Methotrexate:

Advantages:

1. **Established Efficacy:** Methotrexate has been shown to be long-term effective in lowering disease activity and delaying joint deterioration. It is widely regarded as the cornerstone of RA therapy.
2. **Cost-Effective**: Compared to more recent biologic or targeted synthetic DMARDs like Tofacitinib, methotrexate is less expensive since it is accessible in generic versions.
3. **Well-Tolerated**: Methotrexate is generally well tolerated by the majority of patients, with side effects that are usually modest and controllable with appropriate monitoring and dosage modifications.
4. **First-Line Therapy**: Because of its shown effectiveness, favorable safety profile, and affordability, it is frequently suggested as the initial treatment for RA.

Disadvantages:

1. **Slow Onset of Action**: Compared to tofacitinib, methotrexate may take weeks or months to produce the best therapeutic results, which delays the alleviation of symptoms.
2. **Possible Side consequences**: Methotrexate may have unfavorable consequences that need to be closely watched for, including hepatotoxicity, bone marrow suppression, gastrointestinal distress, and lung toxicity in certain people.
3. **Administration Route**: Although parenteral administration (subcutaneous or intramuscular injections) is sometimes necessary for some patients, oral methotrexate is the most usually utilized form of the medication.[43,44]

While methotrexate and tofacitinib are both efficacious therapies for RA, their modes of action, safety profiles, and needs for monitoring differ. Because of its well-established efficacy, cost-effectiveness, and safety profile, methotrexate is frequently advised as first-line treatment. Patients who do not react well to methotrexate or other traditional DMARDs may be prescribed tofacitinib; however, the hazards and benefits of doing so must be carefully addressed.

The decision between methotrexate and tofacitinib should ultimately be made on an individual basis taking into account the patient's preferences, comorbidities, treatment history, and degree of the disease. In order to maximize therapy results and guarantee patient safety when managing rheumatoid arthritis, close communication between patients and healthcare professionals is necessary.[45,46]

There are a number of comparison studies comparing the safety and effectiveness of methotrexate with tofacitinib in RA patients. All things considered, tofacitinib showed either equal or greater effectiveness than methotrexate in terms of lowering disease activity, enhancing physical function, and halting the advancement of radiography. Furthermore, compared to methotrexate, tofacitinib was linked to faster rates of clinical remission and a quicker start of effect. Tofacitinib, however, was also linked to a higher incidence of a few side effects, such as severe infections, high cholesterol, and gastrointestinal perforations, which called for close observation.[47,48]

The review's conclusions indicate that although tofacitinib shows promise in the treatment of RA, there are safety issues with its usage that need to be carefully considered. However, methotrexate is still a dependable and well-tolerated choice, especially for the long-term therapy of RA. The severity of the patient's disease, any coexisting conditions, and the intended course of therapy should all be taken into consideration while

making treatment options. Tofacitinib treatment requires close monitoring for adverse events, and ongoing evaluations of safety and effectiveness results are necessary.[49,50]

Conclusion

In order to wrap up, this study thoroughly assesses and contrasts the safety and effectiveness profiles of methotrexate and tofacitinib in the treatment of rheumatoid arthritis (RA). This study offers important insights into the relative advantages and disadvantages of these two widely used disease-modifying antirheumatic medications (DMARDs) by a thorough examination of the existing clinical data. Tofacitinib has encouraging effectiveness, as evidenced by its quick beginning of action, notable improvements in disease management, and positive patient-reported outcomes; nonetheless, usage of this medication calls for close monitoring for certain side effects, including severe infections and gastrointestinal perforations.

Conversely, methotrexate, a cornerstone treatment for RA for a long time, has a solid safety record, proven effectiveness, and is a dependable choice for a lot of people. Individualized treatment plans should take into account the patient's preferences, comorbidities, history of therapy, and severity of the condition. Additionally, the advantages and disadvantages of each prescription should be carefully considered. In summary, this review advances knowledge about the best ways to treat RA and guides clinical judgment to improve patient outcomes and guarantee the safe and efficient care of this long-term inflammatory disease.

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