Saudi Journal of Medicine and Public Health

https://saudijmph.com/index.php/pub

https://doi.org/10.64483/202522357

Real-World Effectiveness of Infliximab: An Updated Review for Pharmacists

Abdulelah Hassan Ayashi Majrashi [(1)] , Emad Ali Ayoub Hakami [(2)] , Khaled Alhamidi Alanazi [(3)] , Intisar Awadh Alanazi [(4)] , Al Anoud Abdullah Raheel Al Anzi [(5)] , Ahmed Abubakr Ahmed Bajbair [(6)] , Amirah Mousa Ali Mokali [(7)] , Dhaifallah Mohammed Moraya [(7)] , Khalid Rashed Almutiri [(8)] , Fahad Jaber Salem Allughbi [(9)] , Abdulmajeed Fahad Eid Almuqati [(10)] , Rayan Faisal Falah Al Otaibi [(10)]

(1) Alhurrath G H,Ministry of Health, Saudi Arabia,
(2) Jazan Specialized Hospital (Jazan Health Cluster),Ministry of Health, Saudi Arabia,
(3) SFH,Ministry of Health, Saudi Arabia,
(4) Sulaimaniyah Health Care Center,Ministry of Health, Saudi Arabia,
(5) King Khalid General Hospital in Hafar Al-Batin,Ministry of Health, Saudi Arabia,
(6) Jazan Health Cluster,Ministry of Health, Saudi Arabia,
(7) Jazan Specialized Hospital,Ministry of Health, Saudi Arabia,
(8) Riyadh Third Health Cluster – Nafi General Hospital,Ministry of Health, Saudi Arabia,
(9) Faifa General Hospital,Ministry of Health, Saudi Arabia,
(10) Rawaidah General Offer Hospital – Riyadh,Ministry of Health, Saudi Arabia

Abstract

Background: Infliximab, a chimeric monoclonal antibody targeting tumor necrosis factor-alpha (TNF-α), is widely used for immune-mediated inflammatory disorders. Its clinical effectiveness is influenced by immunogenicity, pharmacokinetics, and safety considerations.

Aim: This review aims to summarize updated evidence on infliximab's real-world effectiveness, approved indications, off-label uses, mechanism of action, pharmacokinetics, administration, adverse effects, and monitoring strategies for pharmacists.

Methods: A comprehensive literature review was conducted, integrating regulatory guidelines, clinical trial data, and real-world practice insights to evaluate infliximab's therapeutic role and safety profile.

Results: Infliximab is FDA-approved for conditions including Crohn disease, ulcerative colitis, rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, and plaque psoriasis, with weight-based intravenous dosing schedules. Off-label applications extend to Behçet disease, pyoderma gangrenosum, and refractory sarcoidosis. Its mechanism involves TNF-α neutralization, reducing cytokine-driven inflammation. Pharmacokinetics reveal a prolonged half-life (7–12 days), supporting intermittent dosing. Adverse effects include infusion reactions, hepatotoxicity, infection risk (notably tuberculosis and hepatitis B reactivation), and rare neurologic or autoimmune phenomena. Boxed warnings highlight infection and malignancy risks. Monitoring protocols emphasize TB and hepatitis screening, cardiac assessment, and vaccination planning.

Conclusion: Infliximab remains a cornerstone biologic therapy, offering substantial clinical benefit when used with rigorous screening, structured monitoring, and interprofessional collaboration. Pharmacists play a pivotal role in optimizing dosing, preventing drug interactions, and educating patients to enhance adherence and safety.

Keywords: Infliximab, TNF-α inhibitor, immunogenicity, biologic therapy, adverse effects, monitoring, pharmacokinetics.

Introduction

Infliximab is a biologic therapeutic agent classified as a monoclonal antibody that exerts its clinical effect primarily through inhibition of tumor necrosis factor alpha (TNF-α).[1] By targeting this pivotal pro-inflammatory cytokine, infliximab modulates immune-mediated pathways that are central to the pathogenesis and persistence of several chronic inflammatory disorders. As with other antibody-based biologics, however, the administration of infliximab can be complicated by host immune recognition of the therapeutic protein, which may lead to immunologic responses that compromise clinical efficacy. Such responses can manifest as the development of anti-drug antibodies, with subsequent attenuation of pharmacologic activity and, in some cases, diminished durability of therapeutic benefit. To mitigate these immunogenic phenomena and to preserve the intended therapeutic effect, infliximab is often prescribed alongside methotrexate. The concomitant use of methotrexate is clinically valued for its capacity to reduce the likelihood and magnitude of host immune reactions against infliximab, thereby limiting the potential for

*Corresponding author e-mail: Abdulelahhm@Moh.Gov.Sa (Abdulelah Hassan Ayashi Majrashi).
Receive Date: 25 November 2025, Revise Date: 20 December 2025, Accept Date: 22 December 2025

neutralizing antibody formation and helping maintain adequate drug exposure over time. This strategy is especially relevant when sustained disease control is required, as blunting immunogenicity can support more consistent clinical responses and reduce the risk of secondary loss of efficacy. In the context of rheumatoid arthritis, the concurrent administration of methotrexate is not merely a common clinical approach but a regulatory expectation. Specifically, the U.S. Food and Drug Administration (FDA) indication for infliximab in rheumatoid arthritis requires its use in combination with methotrexate.[2] This requirement reflects the established role of methotrexate in enhancing treatment reliability by lowering immunogenic risk and supporting the overall effectiveness of infliximab within this disease setting [1][2].

FDA-Approved Indications

Infliximab received approval from the United States Food and Drug Administration in 1998 for use across a spectrum of immune-mediated inflammatory diseases, with indication-specific dosing regimens that reflect the distinct therapeutic goals of induction of response followed by sustained maintenance of disease control. In clinical practice, the approved dosing schedules are structured to achieve adequate early cytokine suppression through a loading phase and then preserve remission or low disease activity through periodic infusions. The dosage is weight-based and administered intravenously, underscoring the importance of individualized dose calculation and adherence to scheduled infusion intervals in order to optimize therapeutic exposure and long-term outcomes. For Crohn disease, infliximab is indicated in adults and pediatric patients aged 6 years and older who have moderate to severe, active disease and who have demonstrated an inadequate response to conventional therapy. The approved induction regimen consists of 5 mg/kg administered intravenously at weeks 0, 2, and 6, followed by a maintenance schedule of 5 mg/kg every 8 weeks. This approach is designed to rapidly control inflammatory activity and then maintain clinical benefit over time. Importantly, in individuals who fail to derive sufficient benefit at the 5 mg/kg dose, escalation to 10 mg/kg may be considered, reflecting a clinically recognized need to address variability in response and pharmacodynamic requirements across patients.[3]

For ulcerative colitis, infliximab is approved for adult patients with moderate to severe, active disease who have not achieved satisfactory control with conventional therapeutic options. The recommended regimen parallels the induction–maintenance framework employed in Crohn disease, with 5 mg/kg administered intravenously at 0, 2, and 6 weeks as the initial induction phase, followed by maintenance dosing of 5 mg/kg every 8 weeks. This schedule aims to provide timely improvement in symptoms and mucosal inflammation, while the maintenance interval supports ongoing suppression of disease activity to reduce the risk of relapse and the cumulative burden of inflammation.[4] In rheumatoid arthritis, infliximab is approved for patients with moderate to severe, active disease using a lower induction dose than that applied in inflammatory bowel disease. The induction protocol is 3 mg/kg given intravenously at weeks 0, 2, and 6, transitioning thereafter to maintenance infusions every 8 weeks. This regimen is intended to reduce synovial inflammation, alleviate symptoms, and limit the progression of joint damage by sustained blockade of tumor necrosis factor–mediated pathways. The structured dosing cadence also reflects the chronicity of rheumatoid arthritis and the need for consistent long-term disease control.

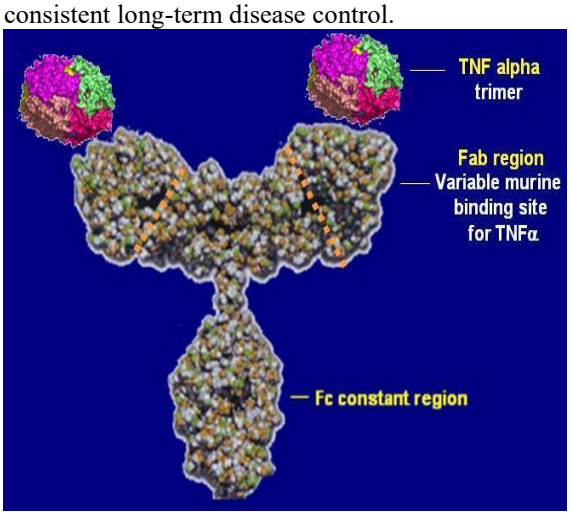

Fig. 1: Infliximab.

For ankylosing spondylitis, infliximab is indicated in patients with active disease, with dosing set at 5 mg/kg administered intravenously at weeks 0, 2, and 6 for induction. Maintenance therapy then proceeds at 5 mg/kg every 6 weeks, a slightly shorter interval than that used in several other indications. This maintenance frequency aligns with the therapeutic objective of sustained improvement in axial symptoms, function, and inflammatory burden, recognizing that ongoing suppression of inflammatory activity is often necessary to preserve mobility and quality of life. In psoriatic arthritis, infliximab is approved for active disease at an induction dose of 5 mg/kg given intravenously at weeks 0, 2, and 6, followed by a maintenance schedule of 5 mg/kg every 8 weeks. This regimen is intended to address both musculoskeletal and, when present, associated dermatologic manifestations by attenuating the inflammatory cascade central to psoriatic disease. The induction phase supports prompt symptom reduction, while the maintenance phase is designed to sustain clinical response and prevent recurrence of inflammatory activity. For plaque psoriasis, infliximab is approved for adult

patients with chronic severe plaque psoriasis. The recommended dosing is 5 mg/kg intravenously at 0, 2, and 6 weeks as induction, followed by 5 mg/kg every 8 weeks for maintenance therapy. This schedule reflects the need for initial rapid improvement in extensive or severe cutaneous disease and continued control thereafter, with maintenance infusions supporting durable suppression of the inflammatory pathways that drive plaque formation and persistence [2][3][4].

Off-Label Uses

Beyond its established FDA-approved indications, infliximab has been utilized in a range of clinical contexts as an off-label therapeutic option, particularly in disorders characterized by immune dysregulation and excessive inflammatory cytokine signaling. The rationale for such use is largely grounded in the central pathogenic role of tumor necrosis factor alpha (TNF-α) across multiple inflammatory cascades, as well as in accumulating clinical experience suggesting that TNF-α blockade may confer meaningful benefit in selected refractory or severe cases. Off-label prescribing is typically considered when conventional therapies have failed to achieve adequate disease control, when rapid suppression of inflammation is clinically necessary, or when the disease course poses a risk of substantial morbidity. In such settings, infliximab may be deployed with careful attention to risk–benefit considerations, patient-specific factors, and close monitoring for adverse events and therapeutic response. Among the better-described off-label applications is Behçet disease, in which infliximab has been employed to manage severe manifestations, particularly those that are resistant to standard immunosuppressive regimens.[5] Similarly, infliximab has been used in relapsing polychondritis, a rare inflammatory condition affecting cartilaginous structures, where targeted cytokine inhibition may help attenuate recurrent inflammatory flares and limit progressive tissue damage. In pediatric rheumatology, juvenile idiopathic arthritis represents another clinical domain in which infliximab has been used outside formal approval, especially in patients with persistent active disease despite conventional disease-modifying therapies. Dermatologic and neutrophilic dermatoses also feature prominently among reported off-label indications. Infliximab has been administered in pyoderma gangrenosum, a painful ulcerative disorder often associated with systemic inflammatory disease, with the goal of rapidly reducing inflammatory activity and promoting lesion healing when other interventions are insufficient. Pustular psoriasis, particularly when severe or refractory, has likewise been treated with infliximab in an effort to achieve prompt disease control and mitigate systemic complications. In pulmonary and multisystem inflammatory disease, infliximab has been employed as an adjunctive option in refractory sarcoidosis, particularly when disease activity persists despite corticosteroids and other steroid-sparing agents.[6] In addition, hidradenitis suppurativa—an inflammatory follicular disorder associated with painful nodules and sinus tract formation—has been treated with infliximab in selected cases, especially when standard therapies do not provide adequate clinical improvement.[7] Collectively, these off-label uses underscore the expanding clinical exploration of infliximab in difficult-to-treat inflammatory disorders, while also highlighting the need for judicious patient selection and careful monitoring in the absence of indication-specific regulatory approval [5][6][7].

Mechanism of Action

Infliximab is a biologic immunotherapeutic agent developed to modulate dysregulated immune activity and thereby ameliorate the clinical manifestations of selected inflammatory and immune-mediated diseases. As a targeted therapy, it is engineered to intervene at a key upstream mediator of inflammation, allowing for broad downstream effects on inflammatory signaling while maintaining specificity toward a defined molecular target. Infliximab is produced through recombinant DNA technology and is formulated as a purified chimeric immunoglobulin G (IgG) monoclonal antibody, incorporating both murine and human protein sequences. This structural design enables the antibody to recognize and bind tumor necrosis factor alpha (TNF-α) with high specificity and functional potency.[8] By neutralizing TNF-α, infliximab attenuates a cytokine pathway that is central to both acute-phase responses and chronic systemic inflammation. TNF-α is a pleiotropic signaling cytokine that participates in the orchestration of innate and adaptive immune responses, including the propagation and amplification of inflammatory cascades. It is produced by a wide range of cell types, reflecting its diverse physiologic and pathophysiologic roles. Notably, macrophages are a major source of TNF-α, particularly within inflamed tissues, but production is also attributed to CD4+ lymphocytes, natural killer (NK) cells, neutrophils, mast cells, eosinophils, and even neurons, underscoring the cytokine's broad relevance to immune regulation and inflammatory homeostasis. Through receptor-mediated signaling, TNF-α contributes to the initiation and maintenance of inflammatory reactions that characterize conditions such as psoriasis and inflammatory bowel disease, among other immune-mediated disorders. When TNF-α signaling becomes excessive or sustained, it can drive tissue injury, perpetuate leukocyte recruitment, and maintain a self-reinforcing inflammatory milieu [8].

Infliximab exerts its therapeutic effect principally by binding TNF-α with high affinity and thereby preventing TNF-α from engaging its cellular receptors and activating downstream pathways. This neutralization curtails the inflammatory cascade at an

early stage, resulting in reduced cytokine amplification and diminished cellular trafficking to sites of inflammation. Importantly, infliximab demonstrates selectivity for TNF-α and does not inhibit TNF-β, highlighting a degree of molecular specificity within the broader TNF cytokine family. The clinical consequence of TNF-α blockade is a reduction in multiple interrelated inflammatory processes, which collectively contributes to improved disease activity and symptom control in TNF-driven disorders. Physiologically, TNF-α promotes several hallmark inflammatory responses. It induces the production of additional proinflammatory cytokines, including interleukin-1 (IL-1) and interleukin-6 (IL-6), thereby amplifying inflammatory signaling networks.[9] TNF-α also upregulates adhesion molecules, facilitating interactions between leukocytes and the vascular endothelium, and it enhances the migration of leukocytes from the bloodstream into surrounding tissues. This extravasation is supported in part by increased endothelial permeability, which allows immune cells and inflammatory mediators to access inflamed sites more readily.[9] By interrupting these TNF-α–mediated processes, infliximab reduces leukocyte recruitment, dampens cytokine-driven amplification, and helps restore a more regulated inflammatory environment, translating into clinical benefit across several inflammatory disease states [8][9].

Pharmacokinetics

The pharmacokinetic profile of infliximab is characteristic of intravenously administered monoclonal antibodies and is shaped by its large molecular size, confinement largely to the intravascular space, and clearance through immune-mediated catabolic pathways rather than classical hepatic metabolism or renal filtration of intact drug. Understanding these parameters is clinically important because infliximab exposure is closely linked to therapeutic response, durability of benefit, and, in some cases, the emergence of immunogenicity that can accelerate clearance and reduce circulating concentrations. With respect to absorption, infliximab is administered by intravenous infusion; therefore, conventional absorptive processes across biological membranes do not apply. Systemic availability is effectively immediate upon completion of infusion, and peak serum concentrations reflect direct entry into the circulation. Pharmacokinetic evaluation across a broad dosing range has demonstrated that a single intravenous infusion between 3 mg/kg and 20 mg/kg produces a linear relationship between the administered dose and the maximum serum concentration. This dose proportionality indicates predictable early systemic exposure over the evaluated range, supporting weight-based dosing strategies in clinical practice and facilitating dose adjustments when clinically indicated. Regarding distribution, infliximab exhibits limited extravascular penetration compared with small-molecule drugs, owing to its macromolecular structure and dependence on convection and endothelial transport mechanisms. At steady state, the reported volume of distribution is dose-independent, suggesting that distribution kinetics are not meaningfully altered across typical therapeutic dosing. In practical terms, infliximab distributes predominantly within the vascular compartment, consistent with other IgG monoclonal antibodies. This largely intravascular distribution aligns with its primary site of action being a circulating and tissue-accessible cytokine, tumor necrosis factor alpha (TNF-α), while also explaining why serum concentrations can be an informative surrogate for exposure and are commonly used in therapeutic drug monitoring strategies. In terms of metabolism, infliximab is not metabolized through cytochrome P450 enzymes or other conventional hepatic pathways. Instead, as is typical for monoclonal antibodies, it is expected to undergo proteolytic catabolism into smaller peptides and amino acids. These breakdown products may subsequently be reutilized in endogenous protein synthesis or eliminated, including via renal excretion of small fragments rather than intact antibody. The reticuloendothelial system plays a central role in handling immunoglobulins in circulation; immune cells such as macrophages and monocytes contribute to the uptake and processing of IgG antibodies. Infliximab is therefore considered likely to be cleared through mechanisms that include opsonization and subsequent removal by the reticuloendothelial system.[10] This framework also provides a biologically plausible basis for variability in drug clearance, particularly in settings where immune activation, antigen burden, or anti-drug antibodies alter the interaction of the therapeutic antibody with immune clearance pathways [10]. Elimination of infliximab is consequently mediated primarily through reticuloendothelial catabolism rather than direct renal elimination of intact drug. Clinically, infliximab demonstrates a relatively prolonged persistence in the circulation, with an adult half-life reported to range from 7 to 12 days.[11] This extended half-life supports intermittent maintenance dosing schedules and reflects the inherent stability and recycling properties of IgG molecules, while also emphasizing the importance of consistent dosing intervals to maintain effective trough concentrations and sustained suppression of inflammatory activity [10][11].

Administration

Infliximab is administered as a biologic agent through either an intravenous infusion route or, in certain formulations, via subcutaneous injection. The selection of route is determined by the specific product formulation, the approved indication and dosing schedule, the clinical context in which therapy

is initiated or maintained, and practical considerations related to monitoring and patient preference. In clinical settings where rapid attainment of therapeutic exposure is required or where infusion-based protocols are established, intravenous administration remains a central modality. Conversely, subcutaneous administration—where available—may offer an alternative for ongoing therapy in appropriately selected patients, particularly when continuity of treatment and convenience of delivery are prioritized, provided that clinical response and safety are preserved. With respect to dosage forms and strengths, infliximab for intravenous use is supplied as a lyophilized powder that requires reconstitution prior to administration. The commonly available strength for this formulation is 100 mg per vial, intended for preparation and intravenous infusion after reconstitution according to institutional protocols. In addition, infliximab is available as a ready-to-use solution for subcutaneous injection, supplied at a concentration of 120 mg/mL in a single-dose prefilled syringe or pen device. These distinct dosage forms reflect different logistical and clinical workflows: the intravenous product necessitates aseptic reconstitution and controlled infusion conditions, whereas the subcutaneous formulation facilitates a simplified administration process in appropriate settings. Despite its therapeutic utility, infliximab administration is associated with clinically significant hypersensitivity risks. Evidence from clinical studies indicates that infliximab can precipitate both type I and type III hypersensitivity reactions, a consideration that directly informs infusion protocols, patient counseling, and monitoring strategies. Because infusion reactions can range from mild and self-limited symptoms to severe and potentially life-threatening events, preventative measures are frequently employed as part of routine clinical practice, especially in individuals judged to be at increased risk on the basis of prior exposure, previous infusion reactions, or other clinical factors. A widely used prophylactic approach involves administering an antihistamine in combination with acetaminophen approximately 90 minutes before the infusion, with the intention of reducing histamine-mediated symptoms and improving tolerability. In some clinical protocols, the use of a test dose of infliximab is incorporated as an additional precautionary strategy, particularly where there is heightened concern about immediate hypersensitivity. For patients with a prior history suggestive of an anaphylactic reaction to infliximab, more intensive premedication may be adopted, commonly including prednisone in addition to antihistamine and acetaminophen prior to infusion, recognizing the need to blunt severe immune-mediated responses and reduce the likelihood of recurrence. These preventative practices are aligned with the broader goal of enabling continued therapy when clinically necessary while minimizing the probability and severity of infusion-related adverse events. The adult dosing regimens and clinical indications for infliximab have been discussed previously and are applied in conjunction with these administration-focused safety measures [9][10][11].

The administration of infliximab also requires careful consideration in specific patient populations, where comorbid conditions, physiologic changes, and differential susceptibility to adverse effects may influence clinical decision-making. In patients with hepatic impairment, particular caution is warranted because infliximab has been associated with potential hepatotoxicity, and underlying liver dysfunction may increase vulnerability to clinically relevant hepatic adverse events.[12] In such patients, clinicians commonly adopt a heightened level of vigilance, which may include closer clinical follow-up and consideration of baseline and interval assessments consistent with standard practice for biologic therapies used in inflammatory disease. Although the pharmacokinetic handling of monoclonal antibodies is not primarily dependent on hepatic enzymatic metabolism in the manner of small-molecule drugs, the clinical concern relates to reported hepatic injury and the need to identify hepatic adverse reactions promptly in those with limited hepatic reserve. In patients with renal impairment, current guidance indicates that dosage adjustment is not routinely recommended for infliximab.[13][14] This approach is consistent with the expectation that intact monoclonal antibodies are not eliminated primarily through renal filtration, and that their clearance is largely mediated through reticuloendothelial catabolism. Nevertheless, the absence of routine dose adjustment does not eliminate the need for individualized assessment, particularly in patients with advanced renal disease who may have complex comorbidities, altered immune function, or a higher baseline risk of infection—factors that can influence the overall risk–benefit profile of TNF-α inhibition [12][13][14].

Pregnancy introduces distinct administration and safety considerations for infliximab, largely because the drug has been shown to cross the placenta and can be detected in the serum of infants whose mothers received infliximab during gestation for an extended period, reported up to six months after birth.[15] This prolonged presence reflects the pharmacologic persistence of IgG-based therapies and the capacity for fetal exposure, particularly during later stages of pregnancy when placental transfer of IgG is more pronounced. Clinically, this exposure has been linked to concerns regarding neonatal immune effects, including reports from clinicians describing agranulocytosis and adverse reactions following administration of live vaccines in exposed infants.[15] In recognition of these risks, recommendations have been advanced to delay live vaccinations in infants with in utero exposure to infliximab; specifically, a waiting period of six

months or longer is advised before administering live vaccines to such infants.[16] These considerations highlight the importance of coordinated care among gastroenterology, rheumatology or dermatology specialists, obstetric clinicians, and pediatric providers to ensure that maternal disease control is balanced with neonatal safety planning, including clear communication regarding the infant's exposure history and vaccination schedule. Breastfeeding considerations for infliximab are comparatively reassuring, with available evidence indicating that the drug is generally not detectable in breast milk or is present only at very low concentrations, and that absorption by the nursing infant is minimal. Observational findings in infants exposed to infliximab in utero and subsequently breastfed during ongoing maternal therapy have not demonstrated adverse developmental outcomes, and normal growth and development have been reported. Although small quantities have been detected in the milk of some women—raising theoretical considerations of localized immune effects within the infant gastrointestinal tract—these minimal levels have not been regarded as posing significant concern for systemic immunosuppression in the nursing infant. Importantly, for mothers who received infliximab during pregnancy, continuation of therapy while breastfeeding does not appear to prolong drug elimination in the infant, suggesting that postnatal transfer through lactation does not materially extend systemic exposure beyond what has already occurred in utero. Accordingly, expert consensus and professional guidelines characterize infliximab as carrying a low risk to the nursing infant and consider it acceptable for use during breastfeeding.[17] As a precautionary measure to further minimize infant exposure at the earliest postpartum stage, a recommendation has been made to delay resumption of infliximab therapy until at least two weeks after delivery where clinically feasible.[17] In practice, this recommendation is integrated with the need to prevent maternal disease flare, which itself can carry meaningful risks for both mother and infant [15][16][17].

In pediatric populations, administration decisions are shaped by age-specific evidence of safety and efficacy as well as by the clinical severity of disease. The safety and efficacy of infliximab have been documented in pediatric patients aged 6 to 17 years for the treatment of Crohn disease and ulcerative colitis, supporting its use in these indications within that age range when clinically appropriate. However, evidence remains insufficient to establish safety and efficacy in children younger than six years with Crohn disease or ulcerative colitis. Moreover, limited available data suggest that treatment outcomes may be less favorable in very young patients, and reports have indicated reduced effectiveness compared with older pediatric cohorts. A study published in 2014, for example, reported a one-year remission rate of 36% in patients younger than seven years, in contrast to an 88% remission rate in older children, with the latter response approximating remission rates typically observed in adult populations.[18] These findings underscore the importance of cautious patient selection and careful monitoring in younger children, along with the consideration of alternative therapeutic strategies or referral to specialized pediatric centers when disease severity necessitates advanced therapy. In older adult patients, infliximab administration requires heightened attentiveness to infection risk. The frequency of serious infections has been observed to be higher among geriatric patients receiving infliximab compared with younger adults, a difference that likely reflects age-related immune changes, greater comorbidity burden, and more frequent concomitant medication use. Consequently, close monitoring for the emergence of serious infections is advisable in older patients, including vigilance for atypical presentations and a low threshold for clinical evaluation when new systemic symptoms arise. These precautions are particularly important because TNF-α inhibition can blunt normal inflammatory responses, potentially masking early warning signs of infection. Cardiac status represents another important consideration, particularly in the setting of heart failure. For patients with mild heart failure, categorized as New York Heart Association (NYHA) class I or II, no specific dosage adjustment is considered necessary; however, caution and careful monitoring remain essential, given the potential for clinical deterioration in susceptible individuals. In contrast, for patients with severe heart failure (NYHA class III or IV), dosing restrictions are required, and the infliximab dose must be limited to less than or equal to 5 mg/kg. This limitation reflects a more conservative approach in a population at higher risk of adverse outcomes, emphasizing the need to weigh therapeutic benefit against potential cardiac risk and to ensure ongoing clinical assessment throughout treatment [18].

Adverse Effects

Infliximab is widely regarded as an effective biologic therapy and, in many patients, is administered with acceptable tolerability. Nevertheless, as with other agents in the tumor necrosis factor alpha (TNF-α) inhibitor class, its use is associated with a spectrum of adverse effects that range from mild, self-limited symptoms to severe and potentially life-threatening complications. The probability and clinical significance of these events may increase with higher cumulative exposure, escalation of dose in selected indications, and advancing patient age—particularly among individuals older than 60 years—who often have greater comorbidity burden and a heightened baseline susceptibility to infection and organ dysfunction.

Accordingly, comprehensive patient counseling, individualized risk stratification, and active surveillance during therapy are essential components of safe and effective infliximab use. A clinically distinctive category of adverse effects relates to administration itself. Infusion-related reactions can occur during or shortly after intravenous delivery and may present with fever, pruritus, flushing, or other hypersensitivity-type manifestations. In some cases, reactions may escalate to anaphylaxis, requiring immediate recognition and emergent management. These events are clinically meaningful not only because of their acute severity but also because they may limit the feasibility of continued therapy, necessitate premedication strategies, or prompt switching to an alternative biologic. Beyond infusion events, commonly reported systemic and gastrointestinal complaints include headache, nausea, abdominal pain, dyspepsia, diarrhea, and constipation. While these symptoms are often manageable, they can contribute to treatment discontinuation in sensitive individuals, especially when persistent or when they overlap with baseline symptoms of the underlying inflammatory disease. Hepatic adverse effects represent another important safety domain. Laboratory abnormalities, such as elevations in alanine aminotransferase (ALT), may be observed and can range from mild and transient to clinically consequential. More serious hepatotoxicity has been described, including severe cases associated with fatal outcomes and cases requiring liver transplantation.[12] This potential severity necessitates vigilance, particularly in individuals with pre-existing liver disease, concomitant hepatotoxic medications, or risk factors for viral hepatitis. When significant liver enzyme elevation or clinical features suggestive of hepatic injury occur, prompt evaluation and, when warranted, discontinuation of the offending agent are critical to reducing the likelihood of progression to severe hepatic dysfunction [12].

Cardiovascular considerations are also relevant. Infliximab has been associated with heart failure and may contribute to worsening clinical status in susceptible patients, a risk that is particularly concerning in individuals with established cardiac disease. Hypertension has also been reported. Although these cardiovascular events are not universal, their potential consequences warrant careful baseline assessment and ongoing monitoring, especially when patients report new dyspnea, edema, reduced exercise tolerance, or other symptoms suggestive of cardiac decompensation. Hematologic abnormalities have been documented as well, including anemia, leukopenia, neutropenia, and thrombocytopenia. Such changes can have practical implications for patient safety because cytopenias may increase susceptibility to infection, contribute to fatigue, or heighten bleeding risk. In parallel, the immunosuppressive nature of TNF-α blockade underpins a major class-wide concern: infections. Patients treated with infliximab may experience common infections, but more importantly, they can develop serious infections that may progress rapidly. Because immunomodulation can alter the typical inflammatory response, early signs of infection may be attenuated; therefore, patients should be instructed to seek urgent medical care if they develop symptoms consistent with infection, such as persistent fever, unexplained malaise, respiratory symptoms, or localized pain and swelling. Certain infectious risks deserve specific emphasis due to their severity and the mechanistic role of TNF-α in host defense. Tuberculosis reactivation is a recognized complication of TNF-α inhibition, reflecting impairment of granuloma maintenance and containment of latent infection. Reactivation of hepatitis B has also been reported, underscoring the need for appropriate screening and prophylactic strategies where indicated. These risks are particularly consequential because reactivation syndromes can be severe, disseminated, and potentially fatal, and they may require prolonged antimicrobial or antiviral therapy in addition to immediate reassessment of immunosuppressive treatment [12].

Neurologic adverse effects, although less frequent, are clinically significant because of their potential irreversibility. Demyelinating disease has been associated with TNF-α inhibitors, and new neurologic symptoms such as sensory changes, weakness, gait disturbance, or visual complaints warrant urgent evaluation. In this context, transient vision loss has been reported secondary to optic neuritis, and such presentations may necessitate discontinuation of the implicated drug.[19][20] These events highlight the importance of maintaining a high index of suspicion for neurologic complications, particularly when symptoms emerge after initiation or dose escalation. Infliximab may also induce paradoxical and autoimmune phenomena. A paradoxical reaction refers to the emergence or worsening of inflammatory conditions that might ordinarily be expected to improve with TNF-α blockade. Clinically, this can include new-onset or exacerbated psoriasis, which is noteworthy given that TNF-α inhibitors are themselves used to treat psoriatic disease in many patients. Lupus-like syndrome is another recognized immune-mediated complication, and manifestations may include arthralgia, rash, serositis, and serologic conversion. Additionally, vitiligo and other autoimmune disorders have been described, and antinuclear antibody positivity has been observed in patients treated with infliximab despite normal baseline levels, supporting the concept that immune modulation can precipitate autoantibody formation in susceptible individuals. Malignancy risk has also been raised in association with TNF-α inhibitor therapy. Reported malignancies include lymphomas, which account for approximately half of the malignancy cases described in some

reports. While the magnitude of risk may vary by patient population, concomitant immunosuppressive therapy, and underlying disease activity, this concern necessitates careful long-term monitoring and thoughtful consideration of cumulative immunosuppressive burden, particularly in patients with additional oncologic risk factors. A central driver of both reduced efficacy and certain adverse effects is immunogenicity. Patients may develop antibodies against infliximab—often described as human anti-chimeric antibodies—which can neutralize the therapeutic effect or increase clearance, leading to diminished drug exposure and loss of clinical response. Immunogenicity is also implicated in the pathogenesis of infusion reactions, as antibody formation can predispose patients to acute hypersensitivity-type events during administration. For this reason, strategies to reduce immunogenicity are often integrated into treatment planning. One commonly adopted approach is co-administration of immunosuppressive agents such as methotrexate, which may reduce antibody formation, improve the durability of response, and decrease the likelihood of infusion-related reactions. This immunomodulatory strategy must be individualized, however, because adding concomitant immunosuppression can also increase infection risk and other adverse outcomes, requiring careful balancing of therapeutic benefit and safety [19][20].

Drug-Drug Interactions

Drug–drug interaction considerations with infliximab are primarily driven by additive or synergistic immunosuppression, rather than by direct effects on hepatic enzyme systems or renal transporters, as monoclonal antibodies do not typically undergo cytochrome P450–mediated metabolism in the manner of small-molecule agents. Consequently, the most clinically consequential "interactions" are often pharmacodynamic in nature, arising when infliximab is combined with other immunomodulatory therapies that influence overlapping immune pathways or that collectively increase susceptibility to infectious complications. In routine practice, careful evaluation of a patient's concurrent immunosuppressive regimen is therefore essential prior to initiating infliximab, during ongoing treatment, and when transitioning between biologic or targeted therapies. Particular caution is warranted when infliximab is used concurrently with other biological agents that are prescribed for similar inflammatory indications. The rationale for avoiding or limiting such combinations is supported by experience with other TNF-α blockers, in which clinical studies have demonstrated an increased risk of serious infections when TNF inhibitors were administered together with agents such as anakinra or abatacept, without a corresponding improvement in clinical benefit. This pattern underscores a central principle in biologic therapy: combining advanced immunomodulators that target distinct nodes of immune signaling may intensify immunosuppression beyond what is necessary to achieve disease control, thereby shifting the risk–benefit balance toward harm. In this context, the clinician's objective is typically to optimize efficacy through appropriate sequencing or switching of therapies, rather than through simultaneous biologic combination, unless a compelling evidence base exists for the specific combination and the patient's clinical scenario demands it. Although infliximab itself is not generally associated with classical metabolic interactions, changes in inflammatory status during initiation or discontinuation may indirectly influence the pharmacokinetics and pharmacodynamics of certain concomitant medications. Inflammation can alter the expression and activity of drug-metabolizing enzymes and transport pathways; therefore, when a potent anti-inflammatory biologic is started or stopped, the patient's overall inflammatory burden may change and, in turn, modify exposure to drugs that require tightly controlled serum concentrations. For this reason, monitoring is recommended during the initiation or discontinuation of infliximab in patients receiving medications with a narrow therapeutic index, including cyclosporine, warfarin, or theophylline.[21] In practical terms, this means clinicians should consider closer laboratory or clinical surveillance—such as drug-level monitoring for cyclosporine where applicable, more frequent assessment of anticoagulation parameters for warfarin, or symptom- and level-based monitoring for theophylline—to mitigate the risk of subtherapeutic efficacy or dose-related toxicity as the inflammatory milieu shifts. Additional interaction concerns arise with other disease-modifying anti-rheumatic drugs (DMARDs) that exert broad immunosuppressive effects. For example, the concomitant use of tocilizumab with biologic DMARDs, including infliximab, warrants caution because of the potential for increased immunosuppression and a heightened risk of infection. While tocilizumab and infliximab target different cytokine pathways, their combined use can suppress immune function through multiple mechanisms, potentially increasing both the incidence and severity of infections and complicating clinical recognition due to attenuated inflammatory signs. Accordingly, clinical practice typically favors using a single biologic agent at a time, with deliberate transitions between therapies when changes are required, rather than concurrent administration. In sum, the interaction profile of infliximab is best understood through a pharmacodynamic lens, emphasizing infection risk, avoidance of biologic combinations lacking proven benefit, and careful monitoring of narrow-therapeutic-index drugs when systemic inflammation is substantially modified.[21]

Contraindications

Infliximab is a potent TNF-α–inhibiting monoclonal antibody with well-established clinical utility in a range of immune-mediated inflammatory diseases; however, its use requires rigorous risk assessment because TNF-α blockade can compromise key physiologic mechanisms of host defense and immune regulation. While infliximab may be administered with careful monitoring in selected higher-risk clinical circumstances, certain conditions are regarded as formal contraindications because the foreseeable harms outweigh potential therapeutic benefit. These contraindications largely reflect situations in which infliximab may precipitate rapid clinical deterioration, provoke severe immune-mediated reactions, or exacerbate life-threatening infectious processes. A major contraindication is severe heart failure, specifically New York Heart Association (NYHA) class III or IV. In this population, infliximab is avoided because TNF inhibitors have been associated with myocardial toxicity and may worsen underlying myocardial dysfunction. The American Heart Association has highlighted concern that TNF inhibition can exacerbate established heart failure, reflecting the complex role of TNF-α in cardiovascular homeostasis and the vulnerability of patients with advanced myocardial impairment. Consequently, administration in NYHA class III/IV heart failure is contraindicated due to the risk of destabilizing cardiac status and precipitating clinical decompensation. Infliximab is also contraindicated in individuals with a prior hypersensitivity reaction to the drug. As a chimeric monoclonal antibody, infliximab may elicit acute immune reactions that range from mild infusion-related symptoms to severe anaphylaxis. A history of hypersensitivity indicates immunologic sensitization and a heightened likelihood of recurrent or more severe reactions upon re-exposure. In such cases, continued administration presents an unacceptable safety risk, particularly given the potential for abrupt airway compromise, hemodynamic instability, and the need for emergent intervention [21].

Active infection is another central contraindication. TNF-α plays a critical role in orchestrating inflammatory responses and maintaining effective containment of pathogens, particularly intracellular organisms. When infliximab is administered in the setting of a clinically significant ongoing infection, the degree of immunosuppression may impair pathogen clearance and facilitate progression to severe disease. For this reason, current severe infection—such as sepsis or tuberculosis—is recognized as a contraindication, and infliximab should not be administered until the infection has been appropriately treated and stabilized. Similarly, more broadly defined active infection is a contraindication because even infections that initially appear localized may disseminate or worsen under TNF-α inhibition, especially in older adults or patients with comorbidities that already predispose to infectious complications. The contraindication framework is reinforced by the medication's boxed warnings, which underscore the most serious and clinically consequential risks associated with infliximab therapy. Foremost among these is the risk of serious infections. Treatment with infliximab is associated with an increased risk of severe infections, including tuberculosis, bacterial sepsis, and invasive fungal infections. In clinical practice, the emergence of a severe infection warrants discontinuation of infliximab, reflecting the principle that ongoing TNF-α inhibition in the setting of systemic infection can worsen outcomes and complicate management. Prior to initiating therapy, patients should be tested for latent tuberculosis, and if testing is positive, appropriate treatment should be started before infliximab is given.[22] Importantly, clinicians are advised to monitor all patients for active tuberculosis during treatment, even when initial screening results are negative, because conversion may occur over time and because screening tests are not perfectly sensitive.[22]

The second boxed warning relates to malignancy. Lymphoma and other malignancies, including fatal cases, have been documented in children and adolescents treated with TNF blockers, including infliximab. Postmarketing reports have also described fatal hepatosplenic T-cell lymphoma, with many cases occurring in patients with inflammatory bowel disease; reported cases have been noted particularly among adolescent or young adult males.[23][24] These warnings emphasize the need to balance the benefits of disease control against long-term oncologic risk, especially in younger patients and in those receiving concomitant immunosuppressive therapies that may compound risk. Beyond absolute contraindications and boxed warnings, a series of warnings and precautions guide clinicians toward heightened vigilance in specific clinical subgroups. Preexisting demyelinating disease is a key precaution, because TNF-α inhibitors have been associated with demyelinating disorders and neurologic events; in patients with known demyelinating pathology, further immune modulation may trigger exacerbation or complicate neurologic stability. Mild to moderate heart failure (NYHA class I/II) also warrants caution rather than absolute avoidance, with careful monitoring for worsening symptoms, given the risk profile seen in more severe heart failure. A history of seizures is similarly relevant, as neurologic adverse events can complicate therapy, and any new neurologic symptoms should prompt evaluation. Age and metabolic comorbidity substantially influence safety. Patients older than 65 are at higher baseline risk of serious infections and may present atypically; therefore, closer monitoring is recommended in this group. Uncontrolled diabetes mellitus further increases susceptibility to infection and may impair healing and immune competence,

heightening concern when introducing TNF-α blockade. Pulmonary comorbidity, particularly moderate to severe chronic obstructive pulmonary disease (COPD), is also identified as a precautionary condition, reflecting the increased vulnerability to respiratory infections and the potential for more severe infectious outcomes in this population [22].

Clinical caution is further required when patients are receiving other biologic or immunomodulatory medications. Infliximab is known to have clinically important cross-risk interactions with certain agents, including abatacept, adalimumab, and etanercept, because combining immunosuppressive drugs can intensify infection risk without consistently providing additional therapeutic benefit. In such circumstances, careful review of the patient's regimen, avoidance of overlapping biologic therapy when possible, and the use of structured switching strategies are central to safe care. Vaccination status and live vaccines constitute another critical contraindication-related domain. Infliximab is contraindicated in patients who have recently received, currently require, or are expected to require live vaccines such as cholera vaccine, live virus MMR vaccine, or smallpox vaccine (live vaccinia virus). The underlying concern is that immunosuppression from TNF-α inhibition can permit uncontrolled replication of live-attenuated organisms, potentially resulting in serious vaccine-associated infection. Therefore, vaccination planning should be integrated into treatment initiation, with general guidance recommending that vaccination occur more than four weeks prior to starting infliximab or be deferred until over three months after immunosuppressive therapy has been discontinued.[25] This timing framework reflects the need to allow adequate immune competence at the time of live vaccine exposure while also recognizing the prolonged immunologic effects that may persist beyond the last administered dose. Taken together, these contraindications, boxed warnings, and precautionary factors highlight that infliximab therapy must be approached with deliberate clinical scrutiny. The aim is not merely to avoid therapy in clearly contraindicated settings, but also to identify and mitigate modifiable risks through infection screening, vaccination planning, careful comorbidity assessment, and vigilant monitoring throughout treatment, thereby maximizing benefit while minimizing the likelihood of serious harm.[22][23][24][25]

Monitoring

Monitoring is an essential component of safe infliximab therapy because tumor necrosis factor alpha (TNF-α) inhibition can alter immune competence, predispose patients to opportunistic and serious infections, and exacerbate selected comorbid conditions. The objective of monitoring is twofold: first, to identify contraindications or modifiable risk factors prior to initiating treatment; and second, to detect adverse events early during therapy so that timely interventions—such as treatment interruption, targeted diagnostic workup, or referral—can be implemented before complications become severe. Because infliximab is used in chronic inflammatory disorders that often require prolonged immunomodulation, an organized pre-treatment evaluation and an ongoing surveillance plan are standard elements of responsible prescribing. Before administering infliximab, tuberculosis (TB) screening is regarded as a critical prerequisite. TNF-α plays a central role in containing Mycobacterium tuberculosis through granuloma formation and maintenance; therefore, TNF-α blockade increases the risk of reactivation of latent TB as well as progression of unrecognized active infection. A thorough TB assessment should begin with a detailed history focusing on previous TB exposure, prior infection, previous treatment, travel or residence in endemic regions, occupational or household contact risk, and symptoms suggestive of active disease. In addition to clinical history, screening should include at least one validated immunologic test. A negative purified protein derivative (PPD) skin test, typically defined here as < 5 mm induration, may be used to support the absence of latent infection, although interpretation should account for immunosuppression and prior Bacillus Calmette–Guérin vaccination, which can affect test performance. Alternatively, a negative interferon-gamma release assay may be used, particularly when prior BCG vaccination or limitations of skin testing are relevant. For patients with a positive screening result, further evaluation is required to exclude active tuberculosis, including chest radiography. A positive TB screening test with a negative chest x-ray suggests latent TB in the absence of symptoms, but clinical judgment remains necessary, and consultation with infectious disease specialists is recommended to ensure appropriate classification and management [25].

When latent TB is identified, infliximab should not be initiated until preventive therapy has been started and a sufficient period of treatment has elapsed to reduce the risk of reactivation under immunosuppression. In the framework provided, initiation of infliximab is recommended only after at least four weeks have passed following the start of isoniazid therapy for latent tuberculosis, reflecting a cautious approach to risk reduction. If active TB is suspected or confirmed, infliximab is deferred, and standard multidrug therapy for active tuberculosis is required, accompanied by infectious disease consultation. This staged strategy is designed to prevent the potentially catastrophic consequence of disseminated or extrapulmonary TB that can occur when TNF-α blockade is introduced in the presence of untreated infection. Importantly, screening is not a one-time step; clinicians must remain vigilant for TB

during therapy, because exposures can occur after treatment initiation and because no screening method is perfectly sensitive, especially in immunocompromised patients. Hepatitis B screening is likewise fundamental prior to infliximab initiation. Reactivation of hepatitis B has been associated with immunosuppressive therapies, including biologics, and can result in severe hepatitis, liver failure, or death if not recognized early. Accordingly, a negative hepatitis screen—particularly a negative hepatitis B surface antigen—is required before treatment. In practice, screening is often broadened to include additional serologic markers to define prior exposure and immunity status; however, the key principle is that active HBV infection must be excluded, and patients with evidence of current or prior infection should be managed in coordination with hepatology or infectious disease specialists to determine the need for antiviral prophylaxis and to establish a monitoring plan. This pre-treatment evaluation protects patients by identifying those at risk for viral reactivation and ensuring that preventive strategies are implemented before immunosuppression begins. Cardiac monitoring is particularly relevant in patients with known heart failure or risk factors for myocardial dysfunction. TNF-α inhibitors have been associated with heart failure exacerbation in susceptible individuals, and the clinical course of heart failure can deteriorate under certain immunomodulatory conditions. Therefore, careful monitoring is recommended, including serial echocardiograms to assess left ventricular function and to detect changes that might indicate worsening cardiac performance. Beyond imaging, clinicians should monitor for clinical indicators of decompensation such as increasing dyspnea, orthopnea, peripheral edema, rapid weight gain, and reduced exercise tolerance. If the patient experiences frequent or worsening heart failure exacerbations, therapy should be discontinued immediately, reflecting the priority of preventing progression to severe decompensation or hospitalization. This approach emphasizes that infliximab is not merely "used with caution" in cardiac disease; it requires structured surveillance and a low threshold for cessation when worsening occurs [25].

In addition to these targeted screening measures, broader clinical history and risk assessment are essential prior to each administration and periodically during therapy. A detailed history should be obtained to identify recent or active infection, as even seemingly mild infections can worsen under TNF-α blockade and progress to systemic disease. Patients should be questioned about fevers, respiratory symptoms, urinary symptoms, skin lesions, dental infections, or other localized concerns, and physical assessment should be performed when indicated. Similarly, clinicians should evaluate for recent or upcoming surgery. Surgical procedures may increase infection risk and require perioperative planning regarding the timing of biologic dosing, wound healing considerations, and postoperative monitoring. Although specific perioperative protocols vary by specialty and procedure, the consistent principle is that treatment decisions should integrate surgical timing and infection risk mitigation. Vaccination status is another key component of monitoring and preventive care in patients receiving infliximab. Because infliximab suppresses immune responses, live virus vaccines are generally avoided during therapy due to the risk of vaccine-derived infection. Therefore, it is recommended that patients receiving infliximab not receive live vaccines, and clinicians should explicitly review whether the patient has recently received any live vaccine or anticipates needing one in the near future. This assessment should occur both before initiation and during ongoing treatment, because vaccine schedules, travel requirements, occupational requirements, and outbreak-related vaccination campaigns can arise unexpectedly. When possible, required immunizations should be administered prior to starting infliximab, allowing adequate time for immune response development. Overall, monitoring for infliximab therapy should be understood as a dynamic, ongoing process that integrates infection screening, viral hepatitis evaluation, cardiac surveillance when relevant, and continuous clinical assessment for intercurrent infections, surgical planning needs, and vaccination considerations. By implementing systematic pre-treatment testing—particularly for tuberculosis and hepatitis B—alongside careful longitudinal clinical monitoring, clinicians can substantially reduce preventable risks while preserving the therapeutic benefits that infliximab offers in chronic inflammatory disease management [25].

Toxicity

Infliximab is typically administered under the supervision of trained healthcare personnel in controlled clinical environments, a practice that substantially reduces the likelihood of dosing errors and enables prompt recognition and management of acute adverse events. In this context, clinically significant toxicity attributable to infliximab itself is considered uncommon, and reports of true overdose-related toxic syndromes are rare. Unlike many small-molecule medications, infliximab does not have a well-defined toxidrome or a predictable pattern of dose-dependent organ toxicity that would allow for a standardized antidotal approach. Consequently, there is no specific reversal agent or targeted pharmacologic treatment for infliximab toxicity. If toxicity is suspected—whether due to inadvertent administration of an excessive dose, an unexpected heightened sensitivity, or an acute severe reaction temporally associated with infusion—the principal management strategy is supportive care tailored to the patient's clinical presentation. This may include close monitoring of vital signs, maintenance of

airway and cardiovascular stability, provision of intravenous fluids when indicated, symptomatic treatment of associated manifestations, and escalation to advanced supportive measures for severe events. Because infliximab-related emergencies often overlap clinically with hypersensitivity or infusion reactions, supportive management commonly emphasizes rapid assessment, early intervention, and careful observation in an appropriately equipped medical setting. In summary, given the rarity of overt toxicity and the absence of a specific antidote, optimal management relies on vigilant monitoring and individualized supportive treatment aimed at stabilizing the patient and addressing complications as they arise [25].

Enhancing Healthcare Team Outcomes

Infliximab remains a cornerstone biologic therapy for a range of chronic, immune-mediated inflammatory disorders, and its optimal use depends not only on selecting an appropriate clinical indication but also on ensuring that therapy is delivered safely, consistently, and in a manner that supports long-term adherence and clinical response. Because infliximab therapy is frequently initiated and maintained over extended periods, the quality of outcomes is strongly influenced by the performance of the interprofessional healthcare team. In practice, this requires coordinated clinical decision-making, systematic pre-treatment assessment, standardized administration procedures, and continuous monitoring for adverse effects and loss of efficacy. When these elements are executed collaboratively, the healthcare team can reduce preventable complications, limit avoidable treatment interruptions, and improve both clinical endpoints and patient experience. Specialist involvement is central to evidence-based use of infliximab in the conditions for which it is commonly prescribed. Patients with inflammatory bowel disease are typically managed in collaboration with a gastroenterologist, given the complexity of disease phenotypes, the need to tailor induction and maintenance strategies, and the importance of evaluating objective markers of inflammatory activity. Similarly, for rheumatoid arthritis and psoriatic arthritis, consultation with a rheumatologist is generally required to confirm diagnosis, evaluate disease severity, and align infliximab therapy with treat-to-target strategies and concomitant disease-modifying regimens. While specialist expertise shapes therapeutic selection and longitudinal disease management, safe initiation of infliximab extends beyond specialty prescribing and depends on the coordinated efforts of clinicians across disciplines, nursing professionals, and pharmacists. A key shared responsibility across the interprofessional team is ensuring that patients undergo appropriate pre-treatment screening and risk stratification before the first dose is administered. This includes a documented evaluation for tuberculosis and hepatitis B, given the increased risk of reactivation associated with TNF-α inhibition, as well as an assessment of cardiac status when clinically indicated to reduce the risk of heart failure exacerbation. Establishing these baseline parameters requires clear workflows, timely ordering and review of tests, reliable documentation, and explicit communication among team members to prevent missed or delayed screening. When the team functions cohesively, it can standardize these requirements into routine practice, thereby preventing avoidable harm and facilitating rapid but safe treatment initiation [26].

Nursing practice is particularly pivotal because infliximab is often delivered through scheduled infusions or supervised administration pathways. Close monitoring by specialty-trained nurses is necessary during and after administration to identify infusion reactions early, assess tolerability, and ensure that supportive measures are promptly instituted when needed. Nursing staff also play an essential role in ongoing patient education, reinforcing infection precautions, clarifying what symptoms warrant urgent medical attention, and supporting adherence to follow-up schedules. Moreover, because mild to moderate adverse effects can accumulate over time and may influence willingness to continue therapy, nurse-led assessment and documentation can provide clinicians with actionable information to adjust supportive care, refine monitoring, or reconsider therapy when appropriate. Clinical pharmacists provide complementary expertise that substantially strengthens infliximab care pathways. Pharmacists can contribute to dosing accuracy through verification of weight-based regimens, evaluation of dose escalations, and identification of situations in which therapeutic drug monitoring may be clinically useful. In addition, pharmacists are well-positioned to assess drug–drug interactions, particularly where overlapping immunosuppression could increase infection risk or where changes in inflammatory status may affect narrow-therapeutic-index medications. Pharmacists also serve as accessible medication educators, answering patient questions about administration schedules, expected adverse effects, immunization considerations, and strategies to minimize infusion-related complications. This patient-facing role can improve understanding and engagement, which in turn supports adherence and timely reporting of concerning symptoms. The value of an integrated pharmacy model is illustrated by evidence from real-world practice. One retrospective study evaluated the impact of incorporating a clinical pharmacy team within a tertiary academic inflammatory bowel disease (IBD) center. Over a one-year period, the center received 1800 referrals for advanced IBD therapies, including infliximab, and 98% of patients successfully initiated the intended

treatment. Although insurance denials were encountered in 17% of cases, the team overturned many denials through appeals and secured manufacturer patient-assistance programs for some patients, including those prescribed infliximab. The pharmacy team also implemented more than 2000 pharmacist-initiated interventions, with a predominant focus on preventing interruptions in therapy and delivering targeted patient education. Collectively, these outcomes highlight how clinical pharmacy integration can improve access, continuity, and safe medication use within specialized IBD care settings and support the notion that such integration represents a best practice for centers managing complex biologic therapies.[26] Ultimately, infliximab therapy benefits from an interprofessional model anchored in open communication and clearly defined roles. Effective collaboration among clinicians (MDs, DOs, NPs, PAs), pharmacists, nurses, and relevant specialists enables timely screening, safe administration, proactive adverse-event monitoring, and efficient navigation of logistical barriers such as insurance authorization. By functioning as a coordinated team rather than as isolated contributors, healthcare professionals can enhance therapeutic continuity, reduce preventable complications, and maximize the likelihood that patients experience sustained benefit from infliximab therapy.[26]

Conclusion:

Infliximab represents a highly effective biologic agent for managing chronic inflammatory diseases, provided its use is guided by evidence-based protocols and vigilant risk mitigation. Its ability to neutralize TNF-α offers profound therapeutic benefits across multiple indications, yet this immunomodulatory mechanism also introduces significant safety challenges, including infection risk, hepatotoxicity, and rare autoimmune or neurologic complications. The presence of boxed warnings for tuberculosis reactivation and malignancy underscores the necessity of comprehensive pre-treatment screening and ongoing surveillance. Furthermore, immunogenicity remains a critical determinant of long-term efficacy, necessitating strategies such as concomitant methotrexate use to reduce anti-drug antibody formation. Optimal outcomes depend on interprofessional collaboration, with pharmacists playing a central role in dose verification, infusion safety, and patient education. Structured monitoring for latent infections, cardiac function, and vaccination status is essential to minimize preventable harm. In addition, patient counseling regarding early signs of infection and adherence to infusion schedules enhances therapeutic continuity. As biologic therapies expand in scope and complexity, infliximab exemplifies the need for integrated care models that combine clinical expertise, pharmacologic oversight, and patient engagement. When these principles are applied, infliximab can deliver sustained disease control and improved quality of life for patients with immune-mediated disorders.

References:

[1] Liu Y, Liu S, Liu L, Gong X, Liu J, Sun L, Liu X, Wu L, Chen L, Wang L, Luo L, Lin J, Tie N, Jiang Z, Wu J, Lu F, Sun H, Li X, Yang N, Chai K, Wei H, Da Z, Zhao C, Dai L, Wang Y, Shi G, Zhang Z, Song H, Guo Q, Liu YC, Li Z. Fine Comparison of the Efficacy and Safety Between GB242 and Infliximab in Patients with Rheumatoid Arthritis: A Phase III Study. Rheumatology and therapy. 2022 Feb:9(1):175-189. doi: 10.1007/s40744-021-00396-8.

[2] Maini R, St Clair EW, Breedveld F, Furst D, Kalden J, Weisman M, Smolen J, Emery P, Harriman G, Feldmann M, Lipsky P. Infliximab (chimeric anti-tumour necrosis factor alpha monoclonal antibody) versus placebo in rheumatoid arthritis patients receiving concomitant methotrexate: a randomised phase III trial. ATTRACT Study Group. Lancet (London, England). 1999 Dec 4:354(9194):1932-9

[3] Lahad A, Weiss B. Current therapy of pediatric Crohn's disease. World journal of gastrointestinal pathophysiology. 2015 May 15:6(2):33-42. doi: 10.4291/wjgp.v6.i2.33.

[4] Pola S, Patel D, Ramamoorthy S, McLemore E, Fahmy M, Rivera-Nieves J, Chang JT, Evans E, Docherty M, Talamini M, Sandborn WJ. Strategies for the care of adults hospitalized for active ulcerative colitis. Clinical gastroenterology and hepatology : the official clinical practice journal of the American Gastroenterological Association. 2012 Dec:10(12):1315-1325.e4. doi: 10.1016/j.cgh.2012.07.006.

[5] Alpsoy E, Leccese P, Emmi G, Ohno S. Treatment of Behçet's Disease: An Algorithmic Multidisciplinary Approach. Frontiers in medicine. 2021:8():624795. doi: 10.3389/fmed.2021.624795.

[6] Baughman RP, Valeyre D, Korsten P, Mathioudakis AG, Wuyts WA, Wells A, Rottoli P, Nunes H, Lower EE, Judson MA, Israel-Biet D, Grutters JC, Drent M, Culver DA, Bonella F, Antoniou K, Martone F, Quadder B, Spitzer G, Nagavci B, Tonia T, Rigau D, Ouellette DR. ERS clinical practice guidelines on treatment of sarcoidosis. The European respiratory journal. 2021 Dec:58(6):. pii: 2004079. doi: 10.1183/13993003.04079-2020.

[7] Shih T, Lee K, Grogan T, De DR, Shi VY, Hsiao JL. Infliximab in hidradenitis suppurativa: A systematic review and meta-analysis. Dermatologic therapy. 2022 Sep:35(9):e15691. doi: 10.1111/dth.15691.

[8] Akiho H, Yokoyama A, Abe S, Nakazono Y, Murakami M, Otsuka Y, Fukawa K, Esaki M, Niina Y, Ogino H. Promising biological therapies

for ulcerative colitis: A review of the literature. World journal of gastrointestinal pathophysiology. 2015 Nov 15:6(4):219-27. doi: 10.4291/wjgp.v6.i4.219.

[9] You Y, Stelzl P, Joseph DN, Aldo PB, Maxwell AJ, Dekel N, Liao A, Whirledge S, Mor G. TNF-α Regulated Endometrial Stroma Secretome Promotes Trophoblast Invasion. Frontiers in immunology. 2021:12():737401. doi: 10.3389/fimmu.2021.737401.

[10] Ryman JT, Meibohm B. Pharmacokinetics of Monoclonal Antibodies. CPT: pharmacometrics & systems pharmacology. 2017 Sep:6(9):576-588. doi: 10.1002/psp4.12224.

[11] Scott FI, Lichtenstein GR. Therapeutic Drug Monitoring of Anti-TNF Therapy in Inflammatory Bowel Disease. Current treatment options in gastroenterology. 2014 Mar:12(1):59-75. doi: 10.1007/s11938-013-0004-5.

[12] Infliximab. LiverTox: Clinical and Research Information on Drug-Induced Liver Injury. 2012

[13] Jiang Y, Lin O, Sinha SR. Use of Tumor Necrosis Factor Alpha Inhibitors for Inflammatory Bowel Disease Patients with Concurrent Heart Failure. Digestive diseases and sciences. 2017 Jun:62(6):1597-1606. doi: 10.1007/s10620-017-4574-2.

[14] Lichtenstein L, Ron Y, Kivity S, Ben-Horin S, Israeli E, Fraser GM, Dotan I, Chowers Y, Confino-Cohen R, Weiss B. Infliximab-Related Infusion Reactions: Systematic Review. Journal of Crohn's & colitis. 2015 Sep:9(9):806-15. doi: 10.1093/ecco-jcc/jjv096.

[15] Djokanovic N, Klieger-Grossmann C, Pupco A, Koren G. Safety of infliximab use during pregnancy. Reproductive toxicology (Elmsford, N.Y.). 2011 Jul:32(1):93-7. doi: 10.1016/j.reprotox.2011.05.009.

[16] Penagini F, Cococcioni L, Pozzi E, Dilillo D, Rendo G, Mantegazza C, Zuccotti GV. Biological therapy in pediatric age. Pharmacological research. 2020 Nov:161():105120. doi: 10.1016/j.phrs.2020.105120.

[17] . Infliximab. Drugs and Lactation Database (LactMed®). 2006

[18] Kelsen JR, Grossman AB, Pauly-Hubbard H, Gupta K, Baldassano RN, Mamula P. Infliximab therapy in pediatric patients 7 years of age and younger. Journal of pediatric gastroenterology and nutrition. 2014 Dec:59(6):758-62. doi: 10.1097/MPG.0000000000000533.

[19] Li J, Zhang Z, Wu X, Zhou J, Meng D, Zhu P. Risk of Adverse Events After Anti-TNF Treatment for Inflammatory Rheumatological Disease. A Meta-Analysis. Frontiers in pharmacology. 2021:12():746396. doi: 10.3389/fphar.2021.746396.

[20] Dermawan A, So K, Venugopal K, Picardo S. Infliximab-induced optic neuritis. BMJ case reports. 2020 Dec 22:13(12):. doi: 10.1136/bcr-2020-236041.

[21] Mandarelli G, Iannone F, Ferracuti S, Grattagliano I, Benevento M, Solarino B, Ferorelli D, Catanesi R. Informed consent and biological agents in rheumatology and internal medicine. European journal of clinical investigation. 2022 Sep:52(9):e13805. doi: 10.1111/eci.13805.

[22] Agarwal A, Kedia S, Jain S, Gupta V, Bopanna S, Yadav DP, Goyal S, Mouli VP, Dhingra R, Makharia G, Ahuja V. High risk of tuberculosis during infliximab therapy despite tuberculosis screening in inflammatory bowel disease patients in India. Intestinal research. 2018 Oct:16(4):588-598. doi: 10.5217/ir.2018.00023.

[23] Ulutaş F, Korkmaz C, Yılmaz H, Akça D, Çomut E, Çelık M, Çobankara V. Intestinal Peripheral T-Cell Lymphoma in a Patient with Ankylosing Spondylitis Under Treatment with Infliximab: A Case Report and Review of the Literature. Mediterranean journal of rheumatology. 2022 Jun:33(2):247-251. doi: 10.31138/mjr.33.2.247.

[24] Shah ED, Coburn ES, Nayyar A, Lee KJ, Koliani-Pace JL, Siegel CA. Systematic review: hepatosplenic T-cell lymphoma on biologic therapy for inflammatory bowel disease, including data from the Food and Drug Administration Adverse Event Reporting System. Alimentary pharmacology & therapeutics. 2020 Mar:51(5):527-533. doi: 10.1111/apt.15637.

[25] Lee CK. [Ideal vaccination strategy in inflammatory bowel disease]. The Korean journal of gastroenterology = Taehan Sohwagi Hakhoe chi. 2015 Mar:65(3):159-64

[26] Choi DK, Rubin DT, Puangampai A, Lach M. Role and Impact of a Clinical Pharmacy Team at an Inflammatory Bowel Disease Center. Crohn's & colitis 360. 2023 Apr:5(2):otad018. doi: 10.1093/crocol/otad018.