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List of Available Biologic/targeted synthetic DMARDs

Drug Class	Name	Dose	Route of Administration	Frequency
TNFα Inhibitors	Adalimumab	40mg	SQ	Every 2 weeks
	Certolizumab pegol	200mg	SQ	Every 2 weeks (After titration)
	Etanercept	50mg	SQ	Weekly
		25mg	SQ	Twice weekly
	Golimumab	50-100mg	SQ	Monthly
		2mg/kg	IV (Simponi Aria)	Every 2 months (After titration)
	Infliximab	3-10mg/kg	IV	Every 4-8 weeks
IL-1 inhibitor	Anakinra	100mg	SQ	Daily
IL-1β inhibitor	Canakinumab	4mg/kg (Max 300mg)	SQ	Monthly
IL-6 inhibitors	Tocilizumab	162mg	SQ	Weekly
		8mg/kg	IV	Monthly
	Sarilumab	150-200mg	SQ	Every 2 weeks
IL-17α inhibitor	Ixekizumab	80mg	SQ	Monthly (After titration)
	Secukinumab	150-300mg	SQ	Monthly (After titration)
IL-12/23 inhibitor	Ustekinumab	45-90mg	SQ	Every 3 months (After titration)
B-lymphocyte stimulator inhibitor	Belimumab	200mg	SQ	Weekly (After titration for lupus nephritis)
		10mg/kg	IV	Monthly (After titration)
JAK inhibitors	Tofacitinib (IR, ER)	5-10mg (IR)	PO	Twice daily
		11mg (XR)	PO	Daily
	Upadacitinib ER	15mg	PO	Daily
	Baricitinib	2mg	PO	Daily
CD20 depleter	Rituximab	500-1000mg	IV	On days 1 and 15 every 6 months (No sooner than 4 months)
Selective Co-Stimulation Modulator (CTLA4 inhibitor)	Abatacept	125mg	SQ	Weekly
		500, 750, or 1000mg based on weight	IV	Monthly (After titration)

Last updated March 25, 2022

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Recommended Screening and Monitoring Parameters

What are biologics?

- Biologics are biomedically engineered using biological sources. Often, due to their large molecular size, they are formulated as self-injectable pens/syringes or given as intravenous infusions.

Pearls:

- Targeted synthetic DMARDs (tsDMARDs), although are small molecules, are treated as a biologic. This means a patient should not be on a biologic and a tsDMARD concurrently. For example, a patient with rheumatoid arthritis should not be on etanercept and tofacitinib at the same time.
- Conventional synthetic DMARDs such as methotrexate or sulfasalazine are often given with biologic agents (including biosimilars) to interfere with anti-drug antibody (ADA) formulation.
- When transitioning patients from one biologic to another, ensure the new drug is given when the next dose of the old drug is due. For example, if a patient with rheumatoid arthritis is being switched to etanercept (given as 50mg SQ once weekly) from adalimumab (given as 40mg SQ every other week), the first etanercept dose should be 2 weeks from the last adalimumab dose.
- When patients on biologic therapies are undergoing scheduled/elective surgeries, the biologic therapy should be held at least for one dose prior to the date of surgery.

Screening for a biologic:

- Screen for tuberculosis (e.g., QuantiFERON-TB gold), cocci serologies, and hepatitis B&C serologies (may also consider HIV and VZV).
- Obtain a baseline chest X-ray (anterior posterior) to evaluate for granulomas.
- Ensure patient is up to date on immunizations including annual influenza and shingles (Shingrix is now recommended for any immunocompromised patients aged 18 and older). Indian Health Service Electronic Health Record system should now forecast this. Avoid live vaccines.
- Check quantitative immunoglobulins for rituximab especially if it is a repeat dosing to monitor for hypogammaglobulinemia.
- Establish baseline CBC, CMP, ESR, CRP +/- fasting lipid profile for tsDMARDs and repeat periodically to monitor for toxicity. For example, ANC and Hgb need to be monitored for certain drugs.

Risks and cautions with biologics:

- Contraindications: active/acute infections, active infections with hepatitis B, C, or HIV
- TNF inhibitors are not recommended in malignancy and multiple sclerosis
- NYHA Stage III or IV heart failure
- Side effects: infection, malignancy (skin cancer, lymphoma), lupus (rash), demyelinating disease, new or worsening psoriasis
- Pregnancy: considered generally safe but first line is certolizumab in most cases.

Last updated March 25, 2022