



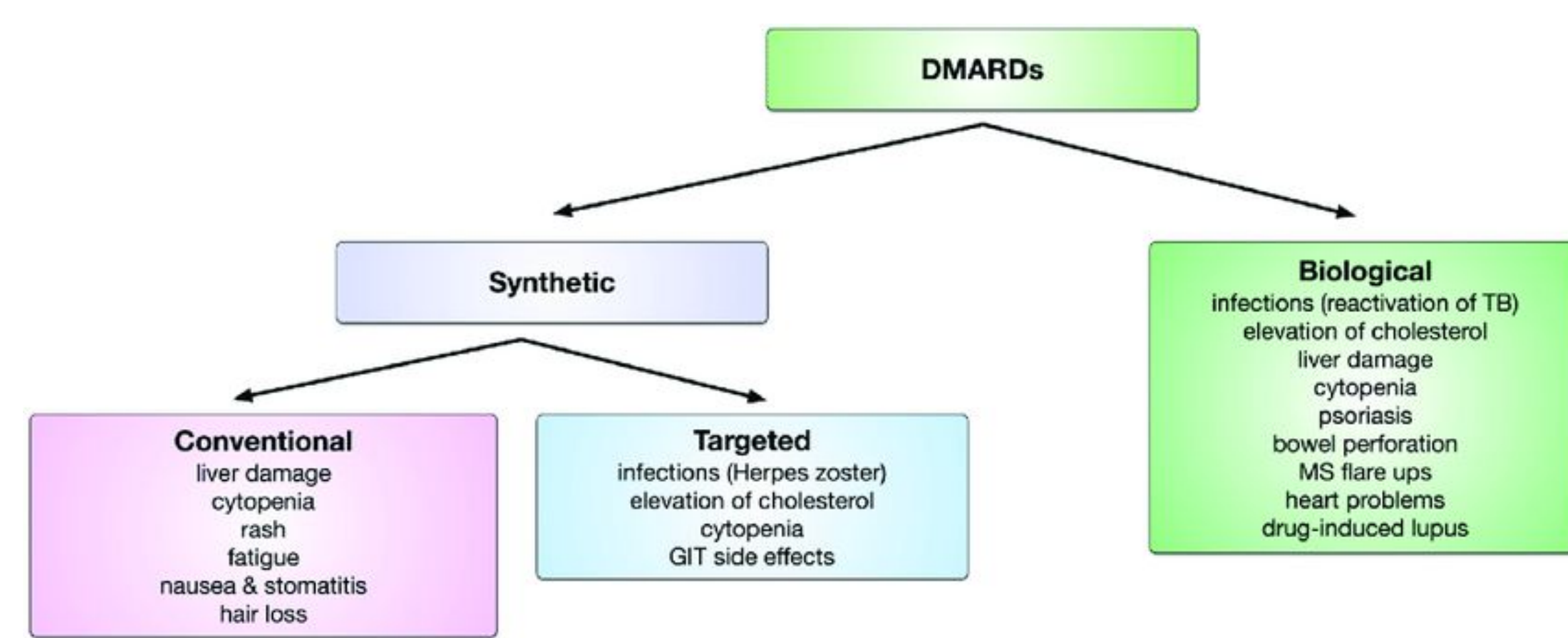
COVID-19 Outcomes in Rheumatoid Arthritis: A Propensity-Matched Analysis of Biologic vs. Conventional DMARDs

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Objectives

Rheumatoid Arthritis, DMARDS, and Covid-19

Disease-Modifying Antirheumatic Drugs (DMARDs) are immune-modulating drugs and are split into conventional and biologic DMARDs. Conventional DMARDs tend to be more wide-reaching in their effects, whereas biologics are more specific.



Adopted from Gohel (2023)

Figure 1.DMARD Targets

Objective

Our study aims to investigate whether Biologic or Conventional Disease Modifying Antirheumatic Drugs lead to better Covid-19 Outcomes.

Methods

TriNetX Database (Research Network)

- Aggregate electronic medical record network

Inclusion Criteria

- ≥ 18 years old with Rheumatoid Arthritis and a Sars-Covid-19 diagnosis.
- Biological or Conventional Disease Modifying Antirheumatic Drug Prescribed within 1 year to 1 day prior to Sars-Covid-19 diagnosis.

Propensity score matching

- Age, Sex, Ethnicity, Race, Sars-Covid-19 Vaccination, Diabetes Mellitus, BMI, Hypertensive Diseases, Asthma, Ischemic Heart Disease, Mood Disorders, and Nicotine Dependence

Outcomes

- 30 Day, 90 Day, and 1 Year Relative Risk of Ventilator Use, Mortality, ICU Admission, Hospital Admission, Long Covid, Myocarditis, and Pulmonary Fibrosis

Statistical Analysis

- Relative Risk Ratios, significance set at $P < 0.05$

Results (1)

Table 1: Rheumatoid Arthritis & Covid-19 Demographics

Demographics	Biologic DMARDs Prescribed (%) N = 4,163	Conventional DMARDs Prescribed (%) N = 4,163	P-Value
Age at Index Surgery (years)	59.5 +/- 15.8	59.6 +/- 15.8	0.922
Male	30.0%	28.6%	0.149
Female	67.5%	68.8%	0.18
White	72.7%	73.9%	0.225
Black or African American	12.0%	12.3%	0.639
Asian	3.1%	2.4%	0.081
Native Hawaiian or Pacific Islander	0.3%	0.2%	0.669
Other Race	4.2%	4.2%	1
Unknown Race	7.5%	6.8%	0.201

Diagnosis	Biologic DMARDs Prescribed (%) N = 4,163	Conventional DMARDs Prescribed (%) N = 4,163	P-Value
SARs-Covid-19 Vaccine	15.2%	15.2%	0.976
Diabetes Mellitus	20.9%	19.1%	0.046
Ischemic Heart Diseases	14.0%	13.8%	0.776
Hypertensive Diseases	46.4%	45.8%	0.583
Asthma	11.9%	10.5%	0.044
Mood [affective] Disorders	20.1%	18.4%	0.052
Nicotine Dependence	6.0%	4.9%	0.023
BMI 19.9 or Less	1.1%	0.7%	0.062
BMI 20-29	6.3%	5.1%	0.012
BMI 30-39	9.4%	7.6%	0.004
BMI 40 or Greater	5.1%	4.2%	0.055

Table 2: 30-Day Sars-Covid-19 Outcomes in Biological DMARD Prescribed RA Patients vs. Conventional DMARD

30-Day Outcomes	Biologic DMARDs Prescribed (%) N = 4,163	Conventional DMARDs Prescribed (%) N = 4,163	% Risk Difference	P Value	Risk Ratio (95% CI)
Ventilator Use*	3.4%	1.5%	1.9%	<0.001	2.295 (1.704, 3.091)
Mortality*	3.9%	2.1%	1.8%	<0.001	1.907 (1.474, 2.467)
ICU Admission	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)
Hospital Admission*	0.2%	0.0%	0.2%	0.002	-----
Long Covid	1.2%	1.1%	0.1%	0.606	1.111 (0.744, 1.658)
Pulmonary Fibrosis*	1.0%	0.4%	0.6%	0.001	2.389 (1.380, 4.135)
Myocarditis	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)

Table 3: 90-Day Sars-Covid-19 Outcomes in Biological DMARD Prescribed RA Patients vs. Conventional DMARD

90-Day Outcomes	Biologic DMARDs Prescribed (%) N = 4,163	Conventional DMARDs Prescribed (%) N = 4,163	% Risk Difference	P Value	Risk Ratio (95% CI)
Ventilator Use*	3.8%	1.8%	2.0%	<0.001	2.092 (1.597, 2.740)
Mortality*	5.5%	3.1%	2.4%	<0.001	1.819 (1.471, 2.249)
ICU Admission	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)
Hospital Admission*	0.2%	0.0%	0.2%	0.002	-----
Long Covid	2.3%	1.8%	0.5%	0.123	1.263 (0.938, 1.701)
Pulmonary Fibrosis*	2.2%	0.9%	1.3%	<0.001	2.528 (1.723, 3.709)
Myocarditis	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)

Results (2)

Table 4: 1-Year Sars-Covid-19 Outcomes in Biological DMARD Prescribed RA Patients vs. Conventional DMARD

1-Year Outcomes	Biologic DMARDs Prescribed (%) N = 4,163	Conventional DMARDs Prescribed (%) N = 4,163	% Risk Difference	P Value	Risk Ratio (95% CI)
Ventilator Use*	4.6%	2.2%	2.4%	<0.001	2.076 (1.625, 2.652)
Mortality*	7.7%	4.5%	3.2%	<0.001	1.726 (1.448, 2.057)
ICU Admission	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)
Hospital Admission	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)
Long Covid	3.5%	2.8%	0.7%	0.069	1.248 (0.982, 1.585)
Pulmonary Fibrosis*	3.7%	1.8%	1.9%	<0.001	2.137 (1.624, 2.812)
Myocarditis	0.2%	0.2%	0.0%	1	1.000 (0.417, 2.400)

30-Day Outcomes:

- Statistically significant higher risk of Mortality
- Statistically significant higher risk of Ventilator Use
- Statistically significant higher risk of Pulmonary Fibrosis

90-Day Outcomes:

- Statistically significant higher risk of Mortality
- Statistically significant higher risk of Ventilator Use
- Statistically significant higher risk of Pulmonary Fibrosis

1-Year Outcomes:

- Statistically significant higher risk of Mortality
- Statistically significant higher risk of Ventilator Use
- Statistically significant higher risk of Pulmonary Fibrosis

Conclusion

When compared to RA patients using Conventional DMARDs, RA patients prescribed Biological DMARDs prior to Sars-Covid-19 infection have significantly higher 30-day, 90-day, and 1-year medical complications.

Limitations:

- Retrospective design (dependent on ICD and CPT coding)
- Adherence to medical recommendations

Future Directions:

- Focus on longer-term outcomes
- Non-database analysis to include more potential confounding comorbidities
- Utilize prospective study designs