Pneumocystis jirovecii Pneumonia Prophylaxis Concise Guidelines in Patients with Glomerulonephritis

BCRenal
Provincial Health Services Authority

- *Pneumocyctis jirovecii* pneumonia (PCP) prophylaxis should be considered for patients on immunosuppression with one or more of the following PCP risk factors, regardless of the immunosuppressive regimen received:
  - Cytomegalovirus (CMV) infection
  - lymphopenia (lymphocyte count < 0.5 x 10^9 cells/L) or low CD4 count (< 200 cells/microL)
  - prolonged neutropenia

Table 1. PCP prophylaxis recommendations according to immunosuppressive therapy used to treat patient with GN

Immunosuppressive Therapy	Applicable Regimen(s)	Prophylaxis Recommendations	Guidance
Prednisone		**Recommended with Conditions**	Recommend prophylaxis if the planned prednisone regimen is ≥ 20 mg/day for at least 4 weeks, and consider discontinuing prophylaxis when the prednisone dosage is tapered to < 20 mg/day.
Antiproliferative agent monotherapy	AZA or MMF monotherapy	**Not Recommended**	Routine prophylaxis not recommended.
Antiproliferative agent plus low-dose prednisone	AZA or MMF + Prednisone < 20 mg/day	**Recommended with Conditions**	Prophylaxis should be considered if the patient has risk factors for opportunistic infections (see Table 2 for risk factors).
Calcineurin inhibitor monotherapy	CsA or TAC monotherapy	**Not Recommended**	Routine prophylaxis not recommended.
Calcineurin inhibitor plus low-dose prednisone	CsA or TAC + Prednisone < 20 mg/day	**Recommended with Conditions**	Prophylaxis should be considered if the patient has risk factors for opportunistic infections (see Table 2 for risk factors).
Calcineurin inhibitor plus antiproliferative agent	CsA or TAC + AZA or MMF	**Recommended with Conditions**	Prophylaxis should be considered if the patient has risk factors for opportunistic infections (see Table 2 for risk factors).
Triple immunosuppression (Calcineurin inhibitor, antiproliferative agent and prednisone)	AZA or MMF + CsA or TAC + Prednisone (any dose)	**Recommended**	Recommend prophylaxis in patients on triple immunosuppressive therapy, irrespective of the prednisone dosage.
Cyclophosphamide		**Recommended**	Recommend prophylaxis until cyclophosphamide is discontinued and any lymphopenia has resolved.
Rituximab monotherapy		**Recommended with Conditions**	Prophylaxis should be considered if the patient has risk factors for opportunistic infections (see Table 2 for risk factors). If prophylaxis is initiated, we suggest continuing it for at least 6 months after the last rituximab dose or until repletion of B cells.
Rituximab plus one other immunosuppressant	Rituximab + AZA, MMF, CsA, TAC, or prednisone (any dose)	**Recommended**	Recommend prophylaxis that is continued for at least 6 months after the last rituximab dose or at least until repletion of B cells. The total duration of prophylaxis may depend on the other immunosuppressant used (refer to relevant sections of this table).

AZA = azathioprine; CsA = cyclosporine; MMF = mycophenolate (mycophenolate mofetil or mycophenolate sodium); TAC = tacrolimus

Table 2. Risk factors for opportunistic infections

▶ **BC Renal GN Committee suggests/recommends consideration for PCP prophylaxis in patients with one or more of these risk factors if they are receiving certain immunosuppressive regimens (see Table 1). Certain risk factors carry more significance than others, and clinical judgment is therefore required when making decisions about prophylaxis initiation.**

- age (> 50 years old)
- chronic lung disease
- alcoholism
- organic brain disease
- diabetes
- malnutrition (BMI < 20 kg/m^2)

Table 3. Summary of PCP prophylaxis agents to aid prescribing

Drug and Strength	Dose	Side effects	Precautions	Cost and Coverage
First-line therapy				
Trimethoprim/sulfamethoxazole (TMP/SMX) SS tab: 80/400 mg DS tab: 160/800 mg	CrCl > 30 mL/min: 1 SS tab PO daily, OR 1 DS tab PO 3x/week CrCl < 30 mL/min: 1 SS tab PO 3x/week	GI intolerance; hepatoxicity (including hepatitis, cholestasis, hepatic necrosis); hyperkalemia; rash; Stevens-Johnson syndrome (rare); toxic epidermal necrolysis (rare); photosensitivity; bone marrow suppression	Pregnancy: Avoid in 1st trimester (congenital malformations, including neural tube defects and cardiovascular malformations); avoid after 32 weeks gestation (kernicterus)	$0.05/day BC PharmaCare benefit
Second-line therapy				
Dapsone 100 mg tab	100 mg PO daily	Hemolytic anemia [seen in patients with and without glucose-6-phosphate-dehydrogenase (G6PD) deficiency]; methemoglobinemia; leukopenia; rash; cholestatic jaundice; hepatitis; GI intolerance	Screen for G6PD deficiency and avoid if deficient (increased risk of hemolysis and methemoglobinemia) Pregnancy: Because of the potential increased risk of hyperbilirubinemia and kernicterus, neonatal care providers should be informed if maternal dapsone is used near term	$0.76/day BC PharmaCare benefit
Third-line therapy				
Aerosolized pentamidine 300 mg/vial	300 mg nebulized once monthly	Dizziness; fatigue; cough; bronchospasm (more common in patients with asthma or a smoking history); metallic taste	Due to the risk of bronchospasm, use caution in patients with asthma or a smoking history; pretreatment with a bronchodilator (e.g., salbutamol) may ameliorate symptoms	$6.23/day ($190/month) Not a BC PharmaCare benefit
Atovaquone 750 mg/5 mL suspension	1500 mg (10 mL) PO daily with food	Headache; insomnia; rash; pruritis; GI adverse effects (diarrhea, nausea, vomiting, abdominal pain)	Must be taken with food (preferably high-fat foods/meals) for optimal absorption; consider an alternative PCP prophylaxis agent for patients who have difficulty taking atovaquone with food	$31/day Not a BC PharmaCare benefit. Only available through certain wholesaler(s)]