Management of Multiple Sclerosis with Disease Modifying Therapies (DMTs)

The 11 Health Canada Approved Pharmaceuticals Used to Treat MS

1. Aubagio® (Teriflunomide)

Therapeutic Dose/Route: One 14mg tablet PO daily

Absorption: Absorbed via digestive tract and metabolized by liver.

Side Effects: Headache, alopecia, hypophosphatemia, hyperkalemia, nausea, lymphocytopenia, neutropenia, increased serum ALT/AST, increased risk of infection, hypertension, heart palpitations, pruritis, acne vulgaris, paresthesia, anxiety, sciatica, burning sensation in skin, weight loss, abdominal pain/distention, cystitis, decreased platelet count, hypersensitivity reaction, arthralgia, musculoskeletal pain, myalgia, carpel tunnel syndrome, peripheral neuropathy, blurred vision, conjunctivitis, acute pancreatitis.

Nursing Implications: Screen for liver function tests before initiating therapy and monthly for at least 6 months after beginning therapy, as drug can cause extreme liver damage, leading to failure. Use with caution in patients with a prior history of hematologic abnormalities. Obtain CBC prior to therapy; monitor for infection and discontinue use if bone marrow suppression. Patient should be current with immunizations and screened for tuberculosis prior to initiating therapy, due to increased risk of infection from neutropenia and lymphocytopenia. Monitor kidney function; small risk of transient renal failure. This drug is not suitable for women who are pregnant. Women of childbearing age should be advised to protect against pregnancy during therapy and for 2 years after discontinuation.

2. Avonex® (Interferon Beta-1a)

Therapeutic Dose/Route: One 30mcg IM injection once/week. May titrate up by 7.5mcg per week until 30 mcg is reached, however 60mcg once/week may be used to treat progressive relapsing MS, or secondary progressive MS with recurrent neurological dysfunction.

Absorption: Absorbed into blood stream - no dosing adjustments required for renal impairment.

Side Effects: Headache, migraine, fatigue/drowsiness, depression, suicidal tendencies, chills, dizziness, seizure, malaise, nausea, abdominal pain, leukopenia, lymphadenopathy, increased serum ALT/AST, antibody development, injection site reaction, rash, alopecia, uticaria, hyperhidrosis, thyroid disease, myalgia, arthralgia, back pain, weakness, skeletal pain, rigors, visual disturbance, flu-like symptoms, fever, chest pain, vasodilation, toothache, thrombocytopenia, anemia, eye disease, xerophthalmia.

Nursing Implications: Due to increased risk of depression and suicidal tendencies, monitor for signs of depression and suicidal ideations. Instruct patient and caregiver on how to properly reconstitute drug for injection, proper injection form and needle disposal.

3. Rebif® (Interferon Beta-1a)

Therapeutic Dose/Route: One 44 mcg subcutaneous injection or one 22 mcg subcutaneous injection three times/week. Each injection should be separated by 48 hours. Available in pre-filled syringe.

Absorption: Absorbed into blood stream - no dosing adjustments required for renal impairment.

Side Effects: Headache, migraine, fatigue/drowsiness, depression, suicidal tendencies, chills, dizziness, seizure, malaise, nausea, abdominal pain, leukopenia, lymphadenopathy, increased serum ALT/AST, antibody development, injection site reaction, rash, alopecia, uticaria, hyperhidrosis, thyroid disease, myalgia, arthralgia, back pain, weakness, skeletal pain, rigors, visual disturbance, flu-like symptoms, fever, chest pain, vasodilation, toothache, thrombocytopenia, anemia, eye disease, xerophthalmia.

Nursing Implications: Due to increased risk of depression and suicidal tendencies, monitor for signs of depression and suicidal ideations. Instruct patient and caregiver on how to properly reconstitute drug for injection, proper injection form and needle disposal.

4. Plegridy™ (Peginterferon Beta-1a)

Therapeutic Dose/Route: When initializing therapy, being with 63 mcg on day 1, then 94 mcg on day 15. Maintenance begins on day 29, with dose as 125 mcg every 14 days via subcutaneous injection.

Absorption: Absorbed via blood stream – no dose adjustment for renal or hepatic impairments.

Side Effects: Headache, chills, injection site reaction, myalgia, asthenia, arthralgia, flu-like symptoms, fever, hyperthermia, generalized pain, increased serum ALT/AST/gamma-glutamyl transferase levels, nausea, vomiting, decreased WBC count, antibody development.

Nursing Implications: Monitor CBC, transaminase levels, signs and symptoms of hepatic injury, hypersensitivity reactions, signs and symptoms of infection, evidence of depression/suicidal ideations, and new onset or worsening of cardiovascular disease.

5. Betaseron®(Interferon Beta-1b)

Therapeutic Dose/Route: One 250 mcg subcutaneous injection every other day, titrate up by 6.25mcg every other day until therapeutic dose reached.

Absorption: Absorbed via blood stream – no dosing adjustments in renal or hepatic impairment, but contraindicated in patients with decompensated liver disease.

Side Effects: peripheral edema, chest pain, headache, generalized pain, hypertonia, myasthenia, chills, dizziness, insomnia, ataxia, rash, dermatological disease, nausea, constipation, diarrhea, abdominal pain, dyspepsia, uterine haemorrhage, urinary urgency, lymphocytopenia, leukopenia, neutropenia, antibody development, injection site reaction, weakness, arthralgia, myalgia, leg cramps, vasodilation, hypertension, peripheral vascular disease, tachycardia, heart palpitations, anxiety, malaise, diaphoresis, alopecia, hypermenorrhea, dysmenorrhea, weight gain, impotence, cystitis, pelvic pain, prostatic disease, lymphadenopathy, increased serum ALT/AST levels, hypersensitivity reaction, dyspnea, injection site necrosis.

Nursing Implications: Monitor injection sites for signs of necrosis. Instruct patient and caregiver on proper administration of subcutaneous injections and proper needle disposal. Emphasize need for adequate hydration and monitor for signs and symptoms of opportunisitic infection.

6. Extavia® (Interferon Beta-1b)

Therapeutic Dose/Route: One 250 mcg subcutaneous injection every other day, titrate up by 6.25mcg every other day until therapeutic dose reached.

Absorption: Absorbed via blood stream – no dosing adjustments in renal or hepatic impairment, but contraindicated in patients with decompensated liver disease.

Side Effects: peripheral edema, chest pain, headache, generalized pain, hypertonia, myasthenia, chills, dizziness, insomnia, ataxia, rash, dermatological disease, nausea, constipation, diarrhea, abdominal pain, dyspepsia, uterine haemorrhage, urinary urgency, lymphocytopenia, leukopenia, neutropenia, antibody development, injection site reaction, weakness, arthralgia, myalgia, leg cramps, vasodilation, hypertension, peripheral vascular disease, tachycardia, heart palpitations, anxiety, malaise, diaphoresis, alopecia, hypermenorrhea, dysmenorrhea, weight gain, impotence, cystitis, pelvic pain, prostatic disease, lymphadenopathy, increased serum ALT/AST levels, hypersensitivity reaction, dyspnea, injection site necrosis.

Nursing Implications: Monitor injection sites for signs of necrosis. Instruct patient and caregiver on proper administration of subcutaneous injections and proper needle disposal. Emphasize need for adequate hydration and monitor for signs and symptoms of opportunisitic infection.

7. Copaxone®(Glatiramer Acetate)

Therapeutic Dose/Route: One 20 mg subcutaneous injection daily

Absorption: Absorbed via blood stream – no dosing adjustments in renal or hepatic impairment.

Side Effects: vasodilation, chest pain, generalized pain, anxiety, skin rash, diaphoresis, nausea, hypersensitivity reaction, development of IgG antibodies, infection, injection site reaction, weakness, back pain, flu-like symptoms, dyspnea, nasopharyngitis, heart palpitations, tachycardia, edema (facial, peripheral), syncope, hypertension, migraine, chills, speech disturbance, abnormal dreams, emotional lability, stupor, weight gain, amenorrhea, hypermenorrhea, vomiting, dental caries, dysphagia, bowel urgency, enlargement of salivary glands, oral candidiasis, urinary urgency, vulvar candidiasis, abnormal pap smear, hematuria, vaginal haemorrhage, impotence, ecchymosis, lymphadenopathy, benign skin neoplasm, abcess, herpes zoster, neck pain, laryngospasm, tremor, diplopia, visual field defect, rhinitis, bronchitis, cough laryngismus, hyperventilation, fever.

Nursing Implications: Monitor patient for post injection reactions including flushing, chest tightness, dyspnea, palpitations. Instruct patient and caregiver on proper use of subcutaneous injection, including proper reconstitution, injection, and needle disposal techniques.

8. Gilenya™ (Fingolimod)

Therapeutic Dose/Route: One 0.5mg capsule PO daily. Recommended for people who have not responded adequately to other DMTs or who are unable to tolerate them.

Absorption: Absorbed via GI tract – use with extreme caution in patients with renal impairment. Use is contraindicated in hepatic impairment.

Side Effects: Headache, increased gamma-glutamyl transferase, nausea, diarrhea, abdominal pain, increased serum ALT/AST, increased risk of infection, back pain, hypertension, atrioventricular block, bradycardia, depression, dizziness, migraine, paresthesia, alopecia, tenia, pruritis, actinic keratosis, weight loss, increased serum triglycerides, lymphocytopenia, leukopenia, basal cell carcinoma, limb pain

Nursing Implications: Obtain a CBC, including a lymphocyte count within 6 months of starting therapy and monitor periodically. Monitoring for liver dysfunction required – baseline transaminase and bilirubin levels at therapy initiation and then every 3 months for the first year and periodically afterwards. Obtain a baseline ECG and monitor for signs of bradycardia. Opthalamic exam should be done within first 6 months of treatment.

9. Lemtrada™ (Alemtuzumab)
Therapeutic Dose/Route: Administer 12 mg daily via IV for 5 consecutive days (total 60 mg), followed 12 months later by 12 mg daily for 3 consecutive days (total 36 mg); total duration of therapy is 24 months. Recommended for people who have had an inadequate response to other disease-modifying therapies.
Absorption: Absorbed via the blood stream – dose adjustments required for hematologic toxicitity.
Side Effects: Headache, fatigue, insomnia, paresthesia, rash, uticaria, pruritis, thyroid disease, nausea, diarrhea, oral candidiasis, urinary tract infection, vulvovaginal candidiasis, lymphocytopenia, antibody development, infection, arthralgia, limb pain, back pain, fever, sinusitis, flushing, chest discomfort, tachycardia, peripheral edema, palpitations, bradycardia, hypotension, chills, dizziness, anxiety, pain, equilibrium disturbance, hyperthermia, hypothyroidism, erythema, allergic dermatitis, alopecia, vomiting, abdominal pain, bruise, decreased CD-4 cell counts, decreased WBC counts.
Nursing Implications: Patient must be monitored closely for infusion and hypersensitivity reactions. Patient must be evaluated, as dose adjustments may be required. Monitor for signs and symptoms of infection and thyroid issues.

10. Tecfidera™ (Dimethyl Fumarate)
Therapeutic Dose/Route: 120mg PO, twice daily for 1 week, then titrate up to maintenance dose of 240mg PO, twice daily.
Absorption: Absorbed via the GI tract – capsules should not be crushed. No dose adjustments required for renal or hepatic impairment.
Side Effects: flushing, abdominal pain, diarrhea, nausea, vomiting, dyspepsia, infection, skin rash, proteinuria, lymphocytopenia, increased serum ALT level.
Nursing Implications: Obtain baseline CBC and monitor for lymphocytopenia. Do not initiate during time of serious infection. Monitor LFTs and serum ALT. Assess and monitor for weight loss due to common GI side effects, though GI effects usually resolve after a few weeks of therapy.

11. Tysabri® (Natalizumab)
Therapeutic Dose/Route: 300mg IV infused over 60 minutes, every four weeks. Recommended for people who have not responded adequately to other DMTs or who are unable to tolerate them.
Absorption: Absorbed via the blood stream – no dose adjustment for renal or hepatic impairment.
Side Effects: Headache, fatigue, depression, rash, nausea, gastroenteritis, abdominal discomfort, UTI, arthralgia, back/extremity pain, increased risk of infection, flu-like symptoms, peripheral edema, chest discomfort, vertigo, syncope, dermatitis, dry skin, dysmennorhea, amenorrhea, menstrual irregularities, ovarian cysts, diarrhea, dyspepsia, abdominal pain, constipation, flatulence, weight changes, vaginal infections, urinary incontinence, hematoma, muscle tremors, joint swelling, cough, epitaxis, antibody formation, toothache, hypersensitivity reactions.
Nursing Implications: Assess patient for hypersensitivity reactions during infusion and 60 minutes post infusion. Obtain antibody testing if antibody development is suspected. Obtain baseline brain MRI and monitor for signs and symptoms of PML (progressive multifocal leukoencephalopathy) – if suspected obtain enhanced brain MRI and CSF analysis to look for Jakobs-Creutzfeld viral DNA during and 6 months post treatment. Assess for signs and symptoms of hepatoxicitiy.

References:
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