REAL-WORLD PATIENT CASE STUDY

A male patient in his 40s experiencing a high level of disability and disease activity on a DMT*

- Male in his mid-40s
- High level of disability
- Diagnosed 18 years ago

All information is current as of June 2019.

Contributed by an MS Specialist
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*This case is based on a single patient and may not be fully representative of the overall patient population.
To protect patient privacy, patient details have been modified.
DMT: disease modifying therapy.

REAL-WORLD CASE STUDY:

A male patient in his 40s experiencing a high level of disability and disease activity on a DMT[1]

Disease and treatment history

- Diagnosed with relapsing MS in 2001; started and stopped injectable DMT due to disease progression, side effects, and poor compliance
- Took an oral therapy for ≈1 year but stopped after experiencing 2 relapses
- Began using ambulatory aid 7 years ago
- Started another oral therapy 6 years ago and reported compliance with dosing

Recent disease activity

- Relapses*: none
- MRI activity (brain, C-spine, and T-spine): 3 enhancing lesions and multifocal non-enhancing lesions
- Disability progression: progressive speech and swallowing difficulty; EDSS score not available

Treatment plan

- Completed pre-screening assessments. Informed of the risk of teratogenicity and counseled regarding birth control requirements
- Started treatment with MAVENCLAD in June 2019

Treatment follow-up and outcomes

- Follow-up in 1 month
- Outpatient physical therapy/speech therapy, swallow study

Factors the healthcare provider considered

- Efficacy switch from another DMT due to clinical and radiological progression
- Patient with progressed disability (walks with aid)

All information is current as of June 2019. Any follow-up information is not currently available.

*_Relapses_ defined per treating physician.

EDSS: Expanded Disability Status Scale.

INDICATION and IMPORTANT SAFETY INFORMATION for MAVENCLAD® (cladribine) tablets

MAVENCLAD® (cladribine) is indicated for the treatment of relapsing forms of multiple sclerosis (MS), to include relapsing-remitting disease and active secondary progressive disease, in adults. Because of its safety profile, use of MAVENCLAD is generally recommended for patients who have had an inadequate response to, or are unable to tolerate, an alternate drug indicated for the treatment of MS.

Limitations of Use: MAVENCLAD is not recommended for use in patients with clinically isolated syndrome (CIS) because of its safety profile.

IMPORTANT SAFETY INFORMATION

WARNING: MALIGNANCIES and RISK OF TERATOGENICITY

- **Treatment with MAVENCLAD may increase the risk of malignancy. MAVENCLAD is contraindicated in patients with current malignancy. In patients with prior malignancy or with increased risk of malignancy, evaluate the benefits and risks of the use of MAVENCLAD on an individual patient basis. Follow standard cancer screening guidelines in patients treated with MAVENCLAD.**
- **MAVENCLAD is contraindicated for use in pregnant women and in women and men of reproductive potential who do not plan to use effective contraception because of the potential for fetal harm. Malformations and embryolethality occurred in animals. Exclude pregnancy before the start of treatment with MAVENCLAD in females of reproductive potential. Advise females and males of reproductive potential to use effective contraception during MAVENCLAD dosing and for 6 months after the last dose in each treatment course. Stop MAVENCLAD if the patient becomes pregnant.**

CONTRAINDICATIONS

- Patients with current malignancy.
- Pregnant women, and women and men of reproductive potential who do not plan to use effective contraception during and for 6 months after the last dose in each treatment course. May cause fetal harm.
- Patients with human immunodeficiency virus (HIV).
- Patients infected with active chronic infections (e.g., hepatitis or tuberculosis).
- Patients with a history of hypersensitivity to cladribine.
- Women intending to breastfeed on a MAVENCLAD treatment day and for 10 days after the last dose.

WARNINGS AND PRECAUTIONS

- **Malignancies:** Treatment with MAVENCLAD may increase the risk of malignancy. After the completion of 2 treatment courses, do not administer additional MAVENCLAD treatment during the next 2 years. In clinical studies, patients who received additional MAVENCLAD treatment within 2 years after the first 2 treatment courses had an increased incidence of malignancy. The risk of malignancy with reinitiating MAVENCLAD more than 2 years after the completion of 2 treatment courses has not been studied. Follow standard cancer screening guidelines in patients treated with MAVENCLAD.
- **Risk of Teratogenicity:** MAVENCLAD may cause fetal harm when administered to pregnant women. In females of reproductive potential, exclude pregnancy before initiation of each treatment course of MAVENCLAD and prevent by the use of effective contraception during MAVENCLAD dosing and for at least 6 months after the last dose of each treatment course. Women who become pregnant during treatment with MAVENCLAD should discontinue treatment.
- **Lymphopenia:** MAVENCLAD causes a dose-dependent reduction in lymphocyte count. Concomitant use of MAVENCLAD with hematotoxic drugs may increase the risk of adverse reactions because of the additive hematological effects. Monitor lymphocyte counts before, during, and after treatment.
- **Infections:** Serious, including life-threatening or fatal, infections have occurred. MAVENCLAD reduces the body's immune defense, and an increased risk of infections has been observed in patients receiving MAVENCLAD. Infections occurred in 49% of MAVENCLAD-treated patients compared to 44% of patients treated with placebo in clinical studies; serious or severe infections occurred in 2.4% of MAVENCLAD-treated patients and 2.0% of placebo-treated patients. The most frequent serious infections included herpes zoster and pyelonephritis. Fungal infections were observed, including cases of coccidioidomycosis. Single fatal cases of tuberculosis and fulminant hepatitis B were reported in the clinical program.

Please see Important Safety Information throughout this piece, and click **here** to view full Prescribing Information, including **BOXED WARNING**.

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Assessments prior to starting each treatment course[1]

- **Conduct standard cancer screening:** Follow age-appropriate screening, such as the American Cancer Society (ACS) guidelines, because of the risk of malignancies.* MAVENCLAD is contraindicated in patients with current malignancy[1]
- **Exclude pregnancy:** Exclude pregnancy prior to treatment with MAVENCLAD in females of reproductive potential. MAVENCLAD is contraindicated in pregnant women and in women and men of reproductive potential who do not plan to use effective contraception during MAVENCLAD dosing and for at least 6 months after the last dose in each treatment course
- **Obtain a CBC with differential** including lymphocyte count. Lymphocytes must be:
  - within normal limits before initiating the first treatment course
  - at least 800 cells/µL before initiating the second treatment course

  If necessary, delay the second treatment course for up to 6 months so that lymphocytes recover to at least 800 cells/µL. If this recovery takes longer, the patient should not receive further treatment with MAVENCLAD
- **Rule out latent or acute infections:** Serious, including life-threatening or fatal, infections have occurred. Delay MAVENCLAD treatment until infection is fully resolved or controlled.
  - **Obtain a baseline (within 3 months) MRI prior to the first treatment course because of the risk of PML (progressive multifocal leukoencephalopathy)**
  - **Screen for tuberculosis:** Delay treatment with MAVENCLAD until tuberculosis has been adequately treated
  - **Screen for hepatitis B and C:** MAVENCLAD is contraindicated in patients with active chronic infections
  - **Exclude HIV infection:** MAVENCLAD is contraindicated in patients with HIV
- **Confirm vaccinations and immunizations**
  - **Check for immunity to varicella zoster virus (VZV):** Consider vaccinating patients who are seronegative for VZV prior to initiating MAVENCLAD
  - **Administer all immunizations (except as noted for VZV) according to immunization guidelines prior to starting MAVENCLAD:** Administer live-attenuated or live vaccines at least 4 to 6 weeks prior to starting MAVENCLAD because of a risk of active vaccine infection. Please note that the currently approved COVID-19 mRNA and viral vector vaccines are not live-attenuated or live vaccines[3-6]
- **Obtain liver function tests**[1]

Ongoing monitoring

- **Follow standard cancer screening guidelines**
- **Obtain CBCs at 2 and 6 months after start of treatment:** if the lymphocyte count at month 2 is below 200 cells/µL, monitor monthly until month 6. Administer anti-herpes prophylaxis in patients with lymphocyte counts less than 200 cells per microliter. Patients with lymphocyte counts below 500 cells per microliter should be monitored for signs and symptoms suggestive of infections, including herpes infections

Additional considerations

- Patients with prior malignancy or with increased risk of malignancy: evaluate the benefits and risks of the use of MAVENCLAD on an individual patient basis
- Females and males of reproductive potential should prevent pregnancy by use of effective contraception during MAVENCLAD dosing and for at least 6 months after the last dose in each treatment course
  - Because of the risk of fetal harm, do not take MAVENCLAD if you are pregnant or of childbearing potential. Both men and women should use effective birth control while taking MAVENCLAD
- MAVENCLAD is contraindicated in women intending to breastfeed on a MAVENCLAD treatment day and for 10 days after the last dose
- Initiation of MAVENCLAD in patients currently receiving immunosuppressive or myelosuppressive therapy is not recommended

Refer to the full Prescribing Information for a complete list of treatment considerations prior to starting each MAVENCLAD treatment course. This page is intended to serve as a summary of that information.

*The American Cancer Society recommends that everyone, especially people with chronic illness, have the appropriate cancer screening testing.

IMPORTANT SAFETY INFORMATION (cont.)

WARNINGS AND PRECAUTIONS

- Screen patients for active and latent infections (tuberculosis, hepatitis B or C). Delay treatment until infection is fully resolved or controlled.
- Vaccinate patients who are seronegative for varicella zoster virus (VZV) prior to treatment. Vaccinate patients who are seropositive to VZV with recombinant, adjuvanted zoster vaccine either prior to or during treatment, including when their lymphocyte counts are less than or equal to 500 cells per microliter.
- Administer anti-herpes prophylaxis in patients with lymphocyte counts less than 200 cells per microliter. Monitor for infections.
- Progressive multifocal leukoencephalopathy (PML) has been reported in patients treated with parenteral cladribine for oncologic indications. No case of PML has been reported in clinical studies of cladribine in patients with MS. Obtain a baseline magnetic resonance imaging (MRI) within 3 months before initiating the first treatment course of MAVENCLAD. At the first sign of PML, withhold MAVENCLAD and perform an evaluation.
- Administer all immunizations (except as noted for VZV) according to immunization guidelines prior to starting MAVENCLAD. Administer live-attenuated or live vaccines at least 4 to 6 weeks prior to starting MAVENCLAD due to risk of infection.

- **Hematologic Toxicity:** In addition to lymphopenia, decreases in other blood cells and hematological parameters have been reported with MAVENCLAD in clinical studies. Obtain complete blood count (CBC) with differential including lymphocyte count before and during treatment, periodically thereafter, and when clinically indicated.
- **Graft-versus-Host Disease with Blood Transfusions:** Transfusion-associated graft-versus-host disease has been observed rarely after transfusion of nonirradiated blood in patients treated with cladribine for non-MS treatment indications. In patients who require blood transfusion, irradiation of cellular blood components is recommended.
- **Liver Injury:** In clinical studies, 0.3% of MAVENCLAD-treated patients had liver injury (serious or causing treatment discontinuation) compared to 0 placebo patients. Obtain serum aminotransferase, alkaline phosphatase, and total bilirubin levels prior to treatment. Discontinue MAVENCLAD if clinically significant liver injury is suspected.
- **Hypersensitivity:** If a hypersensitivity reaction is suspected, discontinue MAVENCLAD therapy. Do not use MAVENCLAD in patients with a history of hypersensitivity to cladribine.
- **Cardiac Failure:** In clinical studies, one MAVENCLAD-treated patient experienced life-threatening acute cardiac failure with myocarditis, which improved after approximately one week. Cases of cardiac failure have also been reported with parenteral cladribine used for treatment indications other than multiple sclerosis. Instruct patients to seek medical advice if they experience symptoms of cardiac failure (e.g., shortness of breath, rapid or irregular heartbeat, swelling).

Adverse Reactions: The most common adverse reactions (incidence of >20%) are upper respiratory tract infection, headache, and lymphopenia.

Drug Interactions: Concomitant use with immunosuppressive or myelosuppressive drugs and some immunomodulatory drugs (e.g., interferon beta) is not recommended and may increase the risk of adverse reactions. Acute short-term therapy with corticosteroids can be administered. Monitor for additive effects on the hematological profile with use of hemotoxic drugs. Avoid concomitant use of antiviral and antiretroviral drugs. Avoid concomitant use of BCRP or ENT/CNT inhibitors as they may alter bioavailability of MAVENCLAD.

Use in Specific Populations: Studies have not been performed in pediatric, or elderly patients >65 years, pregnant or breastfeeding women. Use in patients with moderate to severe renal or hepatic impairment is not recommended.

To report SUSPECTED ADVERSE REACTIONS, contact EMD Serono, Inc. at **1-800-283-8088 ext. 5563** or FDA at **1-800-FDA-1088** or **www.fda.gov/medwatch**.

Please see **FULL PRESCRIBING INFORMATION**, including **BOXED WARNING**.

REFERENCES

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6. US Food and Drug Administration. COVID-19 vaccines for 2023-2024. Updated October 04, 2023. Accessed March 12, 2024. https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines-2023-2024

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What would you consider in an MS treatment for a patient with a progressed level of disability experiencing disease activity on a DMT?

In this real-world patient case study, an MS Specialist evaluated the following issues when choosing a treatment for this patient[1]:

- Is it effective in my patient's type of MS?
- Is the dosing schedule appropriate for my patient?
- What are the safety/tolerability considerations for use in this patient?

CLICK HERE TO SEE MORE REAL-WORLD PATIENT CASE STUDIES

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