lenalidomide (le-na-lid-0-mide)

**Classification**
Therapeutic: antianemics
Pharmacologic: immune response modifiers

**Pregnancy Category X.**

**Indications**
- Transfusion-dependent anemia due to specific myelodysplastic syndromes associated with deletion 5q cytogenetic abnormality. Treatment of multiple myeloma with dexamethasone in patients who have received >1 previous therapy. Treatment of mantle cell lymphoma in patients whose disease has relapsed or progressed after 2 prior therapies (excluding bortezomib).

**Action**

**Pharmacokinetics**
- Absorption: Well absorbed following oral administration. Levels are higher in multiple myeloma patients.
- Distribution: Crosses the placenta.
- Metabolism and Excretion: 66% excreted unchanged in urine, some renal excretion involves active secretion.
- Half-life: 3 hr.

**TIME/ACTION PROFILE** (need for transfusions)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>within 3 mo</td>
<td>unknown</td>
<td>unknown</td>
</tr>
</tbody>
</table>

**Contraindications/Precautions**
- **Contraindicated in:** Hypersensitivity; OB: Pregnancy (contraception must be used in males and females); Lactation: Lactation.
- **Use Cautiously in:** OB: Patients with childbearing potential; Renal impairment (may increase risk of adverse reactions; dose should be reduced if CCr < 60 mL/min); Geri: Consider age-related decreases in renal function; Pedi: Safety not established.

**Adverse Reactions/Side Effects**
- **CNS:** dizziness, fatigue, headache, insomnia, depression.
- **Resp:** cough, pharyngitis.
- **CV:** PULMONARY EMBOLISM, edema, chest pain, deep vein thrombosis, palpitations.
- **GI:** HEPATOTOXICITY, abdominal pain, constipation, diarrhea, nausea, vomiting, abnormal taste, anorexia, dry mouth.
- **Derm:** STEVENS-JOHNSON SYNDROME, TOXIC EPIDERMAL NECROLYSIS, pruritus, rash, dry skin, sweating.
- **Endo:** hypothyroidism.
- **F + E:** hypokalemia, hypomagnesemia.
- **Hemat:** NEUTROPENIA, THROMBOCYTOPENIA.
- **MS:** arthralgia, myalgia.
- **Misc:** ANGIOEDEMA, MALIGNANCY, fever, chills, tumor flare reaction, tumor lysis syndrome.

**Interactions**
- **Drug-Drug:** Risk of neutropenia and thrombocytopenia may increase with antineoplastics, immunosuppressants, and radiation therapy. May increase digoxin levels.

**Route/Dosage**

**Myelodysplastic Syndromes**

| PO (Adults) | 10 mg once daily; dose alteration required for hematologic toxicity. |

**Multiple Myeloma**

| PO (Adults) | 15 mg once daily on days 1–21 of repeated 28–day cycles; should be used with dexamethasone (40 mg once daily on days 1, 4, 8, 11, and 17–20 of each 28–day cycle; for the first four cycles, then 40 mg once daily on days 1–4 of each 28–day cycle); dose alteration required for hematologic toxicity. |

**Renal Impairment**

| PO (Adults) | 25 mg once daily on days 1–21 of repeated 28–day cycles; should be used with dexamethasone (40 mg once daily on days 1, 4, 8, 11, and 17–20 of each 28–day cycle; for the first four cycles, then 40 mg once daily on days 1–4 of each 28–day cycle); dose alteration required for hematologic toxicity. |

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Lab Test Considerations:

- Monitor for signs and symptoms of tumor flare reaction (tender lymph node swelling, low-grade fever, rash, pain). Discontinue lenalidomide if rash occurs; may cause Stevens-Johnson syndrome or Toxid Epidermal Necrolysis.
- Assess for signs of deep venous thrombosis and pulmonary edema.

NURSING IMPLICATIONS

PO (Adults):

- Mantle Cell Lymphoma
  - Starting dose is 25 mg/day. If neutropenia develops and neutrophils fall to <5000/mcL, interrupt therapy; add G-CSF, and follow CBC weekly. When neutrophils return to >10,000/mcL, and neutropenia is the only toxicity, resume lenalidomide at 25 mg daily. If neutrophils return to >10,000/mcL and if other toxicity, resume lenalidomide at 15 mg daily. For each subsequent drop: <10,000/mcL, interrupt therapy. Hematologic toxicity may cause thrombocytopenia with an onset of 28 days (range 8–290 days). May require dose interruption and/or reduction and use of blood support and/or growth factors.

- Multiple Myeloma
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- Myelodysplastic Syndrome
  - Starting dose is 25 mg/day — If neutropenia develops and neutrophils fall to <1000/mcL, interrupt therapy; add G-CSF, and follow CBC weekly. When neutrophils return to >10,000/mcL and neutropenia is the only toxicity, resume lenalidomide at 25 mg daily. If neutrophils return to >10,000/mcL, resume at 5 mg less than previous dose. Do not administer doses below 5 mg.

- Polycythemia Vera
  - Starting dose is 25 mg/day — If thrombocytopenia develops and platelets fall to <50,000/mcL, interrupt therapy; add G-CSF, and follow CBC weekly. When platelets return to >100,000/mcL and thrombocytopenia is the only toxicity, resume lenalidomide at 25 mg daily. If platelets return to >100,000/mcL, resume at 5 mg less than previous dose. Do not administer doses below 5 mg.

- Rosai–Dorfman Disease
  - Starting dose is 25 mg/day — If neutropenia develops and neutrophils fall to <1000/mcL, interrupt therapy; add G-CSF, and follow CBC weekly. When neutrophils return to >10,000/mcL and neutropenia is the only toxicity, resume lenalidomide at 25 mg daily. If neutrophils return to >10,000/mcL, resume at 5 mg less than previous dose. Do not administer doses below 5 mg.

- Thalassemia Major
  - Starting dose is 25 mg/day — If neutropenia develops and neutrophils fall to <1000/mcL, interrupt therapy; add G-CSF, and follow CBC weekly. When neutrophils return to >10,000/mcL and neutropenia is the only toxicity, resume lenalidomide at 25 mg daily. If neutrophils return to >10,000/mcL, resume at 5 mg less than previous dose. Do not administer doses below 5 mg.

- Thrombocytosis
  - Starting dose is 25 mg/day — If thrombocytopenia develops and platelets fall to <60,000/mcL, interrupt therapy; add G-CSF, and follow CBC weekly. When platelets return to >100,000/mcL and thrombocytopenia is the only toxicity, resume lenalidomide at 25 mg daily. If platelets return to >100,000/mcL, resume at 5 mg less than previous dose. Do not administer doses below 5 mg.

Assessment

- Assess pregnancy status prior to therapy. Effective contraception must be used for an irregular cycle. Lenalidomide must be discontinued if pregnancy is suspected and for 4 wk following discontinuation of therapy, even with a history of infertility and/ or growth factors.

- Assess for skin rash. Discontinue lenalidomide if rash occurs; may cause Stevens-Johnson syndrome or Toxic Epidermal Necrolysis.

- Assess for signs of deep venous thrombosis and pulmonary edema (dyspnea, chest pain, arm or leg swelling) periodically during therapy; risk is greater when lenalidomide is administered with dexamethasone.

- Assess for signs of tumor flare reaction (tender lymph node swelling, low-grade fever, rash) in patients with Mantle Cell Lymphoma; may mimic disease progression.

- Monitor for signs and symptoms of tumor flare reaction (fever, night sweats, weight loss, diarrhea, bone pain) in patients with Mantle Cell Lymphoma, may mimic disease progression.

- Assess for signs of deep venous thrombosis and pulmonary edema (dyspnea, chest pain, arm or leg swelling) periodically during therapy; risk is greater when lenalidomide is administered with dexamethasone.

- Assess for skin rash. Discontinue lenalidomide if rash occurs; may cause Stevens-Johnson syndrome or Toxic Epidermal Necrolysis.

- Monitor CBC with differential, platelet count, hemoglobin and hematocrit weekly for first 8 wk of therapy and at least monthly thereafter. May require dose interruption and/or reduction and use of blood support and/or growth factors.
lenalidomide

5 mg/day. If thrombocytopenia develops after 4 wk of treatment at 10 mg/day, and platelets are < 50,000/mL or < 50,000/mL with platelet transfusions, interrupt therapy. When platelets return to > 50,000/mL without hematologic failure resume therapy at 5.5 mg. For Multiple Myeloma starting dose is 25 mg/day on days 1–21 of repeated 28-day cycles — If platelets fall to < 50,000/mL interrupt therapy and follow CBC weekly. If platelets return to > 50,000/mL resume at 5 mg less than previous dose. Do not administer doses below 5 mg.

● Monitor liver enzymes periodically during therapy. Stop therapy if enzymes are elevated; may resume when return to normal or decrease dose.

● May cause anemia and leukopenia.

● May cause hypokalemia, hypomagnesemia, and increased ALT levels.

Potential Nursing Diagnoses

Deficient knowledge, related to medication regimen (Patient/Family Teaching)

Implementation

● Patients must meet the following conditions before receiving therapy: they must understand the risks and be able to carry out instructions, be capable of complying with patient registration and patient survey in the Revlimid REMS program, must comply with contraceptive measures, have received both oral and written warnings of the risks of contraception failure and the need for two reliable forms of contraception (female) or the risks of exposing a fetus to the drug and the need to use a latex condom during sexual conduct with a female with childbearing potential (male), acknowledge understanding of those warnings and warnings to use contraceptives when not pregnant, and agree to try to ensure compliance with conditions.

● Lenalidomide can only be prescribed by health care providers registered in the Revlimid REMS program and only be dispensed by a pharmacy that is registered in the Revlimid REMS program.

● PO: Administer once daily, at the same time each day, with water. Capsules should be swallowed whole; do not open, break, or chew.

Patient/Family Teaching

● Instruct patient to take lenalidomide as directed and to comply with all aspects of the Revlimid REMS program. Take missed doses as soon as remembered within 12 hr of dose missed. If more than 12 hrs, skip dose and resume with next scheduled dose; do not administer 2 doses within 12 hrs. Inform patient that they are required to participate in a telephone survey and patient registry while taking lenalidomide. Details are available at www.REVLIMID.com.

● Caution patient not to share lenalidomide with anyone, even someone who has similar symptoms.

● Advise patient to notify health care professional if rash, shortness of breath, chest pain, or arm or leg swelling occurs.

● May cause dizziness. Caution patient to avoid driving and other activities requiring alertness until response to medication is known.

● Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and consult health care professional before taking any new medications.

● Inform female patients that they must use one highly effective method (IUD, hormonal contraceptive, tubal ligation, partner's vasectomy) and one additional method (latex condom, diaphragm, cervical cap) AT THE SAME TIME for at least 4 wk before, during therapy and interruptions of therapy, and for 4 wk following discontinuation of therapy.

● Male patients receiving lenalidomide must always use a latex condom during and for up to 28 days following discontinuation during any contact with females with childbearing potential, even if they have undergone a successful vasectomy.

● Advise patient that they cannot donate blood and male patients cannot donate sperm while taking lenalidomide.

Evaluation/Desired Outcomes

● Decreased anemia in deletion 5q myelodysplastic syndromes with a decreased requirement for transfusion.

● Slowing of multiple myeloma progression.

● Slowing progression of mantle cell lymphoma.

Why was this drug prescribed for your patient?