HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use RENAGEL® safely and effectively. See full prescribing information for RENAGEL®.

RENAGEL® (sevelamer hydrochloride) tablets, for oral use

Initial U.S. Approval: 2000

RECENT MAJOR CHANGES

Warnings and Precautions (5.1) 04/2020

INDICATIONS AND USAGE

• Renagel® is a phosphate binder indicated for the control of serum phosphorus in patients with chronic kidney disease on dialysis. (1)

DOSE AND ADMINISTRATION

• Starting dose is one or two 800 mg tablets three times per day with meals. (2)

• Adjust by one tablet per meal in two-week intervals as needed to obtain serum phosphorus target (3.5 to 5.5 mg/dL). (2)

DOSE FORMS AND STRENGTHS

• Tablets: 800 mg (3)

CONTRAINDICATIONS

• Bowel obstruction. (4)

• Known hypersensitivity to sevelamer hydrochloride or to any of the excipients. (4)

WARNINGS AND PRECAUTIONS

• Serious cases of dysphagia, bowel obstruction, bleeding gastrointestinal ulcers, colitis, ulceration, necrosis, and perforation have been associated with sevelamer use, some requiring hospitalization and surgery. (5.1)

ADVERSE REACTIONS

• The most common reasons for discontinuing treatment were gastrointestinal adverse reactions. (6.1)

• In a parallel design study of 12 weeks duration, treatment-emergent adverse reactions to Renagel Tablets in peritoneal dialysis patients included dyspepsia (12%), peritonitis (8%), diarrhea (5%), nausea (5%), constipation (4%), pruritus (4%), abdominal distension (3%), vomiting (3%), fatigue (3%), anorexia (3%), and arthralgia (3%). (6.1)

• Cases of fecal impaction and, less commonly, ileus, bowel obstruction, and bowel perforation have been reported. (6.2)

To report SUSPECTED ADVERSE REACTIONS, contact Genzyme Corporation at 1-800-847-0069 and or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

DRUG INTERACTIONS

• When clinically significant drug interactions are expected, separate the timing of administration and monitor clinical responses or blood levels of the concomitant medication. (7)

• Sevelamer did not alter the pharmacokinetics of digoxin, enalapril, iron, metoprolol, and warfarin. (7)

• Sevelamer binds ciprofloxacin and mycophenolate mofetil; dose these drugs separately from Renagel. (7)

See 17 for PATIENT COUNSELING INFORMATION

Revased: 04/2020

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FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

Renagel® is indicated for the control of serum phosphorus in patients with chronic kidney disease (CKD) on dialysis. The safety and efficacy of Renagel in CKD patients who are not on dialysis have not been studied.

2 DOSAGE AND ADMINISTRATION

Patients Not Taking a Phosphate Binder. The recommended starting dose of Renagel is 800 to 1600 mg, which can be administered as one or two 800 mg Renagel Tablets with meals based on serum phosphorus level. Table 1 provides recommended starting doses of Renagel for patients not taking a phosphate binder.

Table 1: Starting Dose for Dialysis Patients Not Taking a Phosphate Binder

<table>
<thead>
<tr>
<th>Serum Phosphorus</th>
<th>Renagel 800 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5.5 and &lt;7.5 mg/dL</td>
<td>1 tablet three times daily with meals</td>
</tr>
<tr>
<td>&gt;7.5 and &lt;9.0 mg/dL</td>
<td>2 tablets three times daily with meals</td>
</tr>
<tr>
<td>&gt;9.0 mg/dL</td>
<td>2 tablets three times daily with meals</td>
</tr>
</tbody>
</table>

Patients Switching from Calcium Acetate. In a study in 84 CKD patients on hemodialysis, a similar reduction in serum phosphorus was seen with equivalent doses (approximately mg for mg) of Renagel and calcium acetate. Table 2 gives recommended starting doses of Renagel based on a patient’s current calcium acetate dose.

Table 2: Starting Dose for Dialysis Patients Switching from Calcium Acetate to Renagel (continued)

<table>
<thead>
<tr>
<th>Calcium Acetate 667 mg (Tablets per meal)</th>
<th>Renagel 800 mg (Tablets per meal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 tablets</td>
<td>2 tablets</td>
</tr>
<tr>
<td>3 tablets</td>
<td>3 tablets</td>
</tr>
</tbody>
</table>

Dose Titration for All Patients Taking Renagel. Adjust dosage based on the serum phosphorus concentration with a goal of lowering serum phosphorus to 5.5 mg/dL or less. Increase or decrease by one tablet per meal at two-week intervals as necessary. Table 3 gives a dose titration guideline. The average dose in a Phase 3 trial designed to lower serum phosphorus to 5.0 mg/dL or less was approximately three Renagel 800 mg tablets per meal. The maximum average daily Renagel dose studied was 13 g.

Table 3: Dose Titration Guideline

<table>
<thead>
<tr>
<th>Serum Phosphorus</th>
<th>Renagel Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5.5 mg/dL</td>
<td>Increase 1 tablet per meal at 2-week intervals</td>
</tr>
<tr>
<td>3.5-5.5 mg/dL</td>
<td>Maintain current dose</td>
</tr>
<tr>
<td>&lt;3.5 mg/dL</td>
<td>Decrease 1 tablet per meal</td>
</tr>
</tbody>
</table>

3 DOSAGE FORMS AND STRENGTHS

Tablets: 800 mg white, oval, film-coated, compressed tablets imprinted with RENAGEL 800.

4 CONTRAINDICATIONS

Renagel is contraindicated in patients with bowel obstruction.

Renagel is contraindicated in patients with known hypersensitivity to sevelamer hydrochloride or to any of the excipients.
5 WARNINGS AND PRECAUTIONS

5.1 Gastrointestinal Adverse Events

Patients with dysphagia, swallowing disorders, severe gastrointestinal (GI) motility disorders, including severe constipation, or major GI tract surgery were not included in the Renagel clinical studies. Dysphagia and epophageal tablet retention have been reported in association with use of sevelamer tablets, some requiring hospitalization and intervention. Consider using sevelamer suspension in patients with a history of swallowing disorders.

Cases of bowel obstruction, bleeding gastrointestinal ulcers, colitis, ulceration, necrosis, and perforation have also been reported with sevelamer use [see Adverse Reactions (6.2)]. Inflammatory disorders may resolve upon Renagel discontinuation. Treatment with Renagel should be re-evaluated in patients who develop severe gastrointestinal symptoms.

5.2 Monitor Serum Chemicities

Bicarbonate and chloride levels should be monitored.

5.3 Monitor for Reduced Vitamins D, E, K (clotting factors) and Folic Acid Levels

In preclinical studies in rats and dogs, sevelamer hydrochloride reduced vitamins D, E, and K (coagulation parameters) and folic acid levels at doses of 6 to 10 times the recommended human dose. In short-term clinical trials, there was no evidence of reduction in serum levels of vitamins. However, in a one-year clinical trial, 25-hydroxyvitamin D (normal range 10 to 55 ng/mL) fell from 39 ± 22 ng/mL to 34 ± 22 ng/mL (p < 0.01) with sevelamer hydrochloride treatment. Most (approximately 75%) patients in sevelamer hydrochloride clinical trials received vitamin supplements, which is typical of patients on dialysis.

6 ADVERSE REACTIONS

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

In a parallel design study of sevelamer hydrochloride with treatment duration of 52 weeks, adverse reactions reported for sevelamer hydrochloride (n=99) were similar to those reported for the active-control group (n=101). Overall adverse reactions among those treated with sevelamer hydrochloride occurring in >5% of patients included: vomiting (22%), nausea (20%), diarrhea (19%), dyspepsia (16%), abdominal pain (9%), flatulence (8%), and constipation (8%). A total of 27 patients treated with sevelamer and 10 patients treated with comparator withdrew from the study due to adverse reactions.

Based on studies of 8 to 52 weeks, the most common reason for withdrawal from Renagel was gastrointestinal adverse reactions (3%–16%).

In 143 peritoneal dialysis patients studied for 12 weeks, most adverse reactions were similar to adverse reactions observed in hemodialysis patients. The most frequently occurring treatment-emergent serious adverse reaction was peritonitis (8 reactions in 8 patients [8%] in the sevelamer group and 2 reactions in 2 patients [4%] on active control). Thirteen patients (14%) in the sevelamer group and 9 patients (20%) in the active-control group discontinued, mostly for gastrointestinal adverse reactions. Patients on peritoneal dialysis should be closely monitored to ensure the reliable use of appropriate aseptic technique with the prompt recognition and management of any signs and symptoms associated with peritonitis.

6.2 Postmarketing Experience

The following adverse reactions have been identified during postapproval use of sevelamer hydrochloride (Renagel): hypersensitivity, pruritus, rash, abdominal pain, bleeding gastrointestinal ulcers, colitis, ulceration, necrosis, fecal impaction and uncommon cases of ileus, intestinal obstruction, and intestinal perforation. Appropriate medical management should be given to patients who develop constipation or any worsening of existing constipation to avoid severe complications.

Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to estimate their frequency or to establish a causal relationship to drug exposure.

7 DRUG INTERACTIONS

There are no empirical data on avoiding drug interactions between Renagel and most concomitant oral drugs. For oral medication where a reduction in the bioavailability of that medication would have a clinically significant effect on its safety or efficacy (e.g., cyclosporine, tacrolimus, levothyroxine), consider separation of the timing of the administration of the two drugs [see Clinical Pharmacology (12.3)].

The duration of separation depends upon the absorption characteristics of the medication concomitantly administered, such as the time to reach peak systemic levels and whether the drug is an immediate-release or an extended-release product. Where possible monitor clinical responses or blood levels of concomitant drugs that have a narrow therapeutic range.

Table 4: Sevelamer Drug Interactions

<table>
<thead>
<tr>
<th>Oral drugs for which sevelamer did not alter the pharmacokinetics when administered concomitantly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diclofenac</td>
</tr>
</tbody>
</table>

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Risk Summary

Sevelamer hydrochloride is not absorbed systemically following oral administration and maternal use is not expected to result in fetal exposure to the drug.

Clinical Considerations

Sevelamer hydrochloride may decrease serum levels of fat-soluble vitamins and folic acid in pregnant women [see Clinical Pharmacology (12.3)]. Consider supplementing with these vitamins.

Data

Normal data

In pregnant rats given dietary doses of 0.5, 1.5, or 4.5 g/kg/day of Renagel during organogenesis, reduced or irregular ossification of fetal bones, probably due to a reduced absorption of fat-soluble vitamin D, occurred at 7–21 times the maximum human equivalent dose of 13 g based on 60 kg body weight. In pregnant rabbits given oral doses of 100, 500, or 1000 mg/kg/day of Renagel by gavage during organogenesis, an increase of early resorptions occurred in the high-dose group (human equivalent dose approximately 5 times the maximum clinical trial dose based on 60 kg body weight).

6.2 Lactation

Risk Summary

Sevelamer hydrochloride is not absorbed systemically by the mother following oral administration and breastfeeding is not expected to result in exposure of the child to Renagel.

Clinical Considerations

Sevelamer hydrochloride is not absorbed systemically by the mother following oral administration and breastfeeding is not expected to result in exposure of the child to Renagel.
as sevelamer carbonate, has been studied in human drug-drug interaction studies (2.4–2.8 g single
dose or three times daily with meals or two times daily without meals) with ciprofloxacin, digoxin,
enalapril, iron, metoprolol, mycophenolate mofetil and warfarin. Coadministered single dose of 2.8 g of sevelamer hydrochloride in fasted state decreased the bioavailability of ciprofloxacin by approximately 50% in healthy subjects.

Concomitant administration of sevelamer and mycophenolate mofetil in adult and pediatric patients
decreased the mean MPA Ca × Phosphorus ion product by 38% and 26%, respectively.

Sevelamer carbonate or sevelamer hydrochloride did not alter the pharmacokinetics of a single dose
of enalapril, digoxin, iron, metoprolol and warfarin when coadministered.

During postmarketing experience, cases of increased thyroid stimulating hormone (TSH) levels have
been reported in patients coadministered sevelamer hydrochloride and levothyroxine. Reduction in
concentrations of cyclosporine and tacrolimus leading to dose increases has also been reported in
transplant patients when coadministered with sevelamer hydrochloride without any clinical conse-
quences (e.g., graft rejection). The possibility of an interaction cannot be excluded with these drugs.

### 13. NONCLINICAL TOXICOLOGY

#### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Standard lifetime carcinogenicity bioassays were conducted in mice and rats. Rats were given
sevelamer hydrochloride by diet at 0.3, 1, or 3 g/kg/day. There was an increased incidence of urinary
bladder transitional cell papilloma in male rats of the high-dose group (human equivalent dose twice
the maximum clinical trial dose of 13 g). Mice received dietary administration of sevelamer hydro-
chloride at doses of up to 9 g/kg/day (human equivalent dose 3 times the maximum clinical trial dose).

There was no increased incidence of tumors observed in mice.

In an in vitro mammalian cytogenetic test with metabolic activation, sevelamer hydrochloride caused
a statistically significant increase in the number of structural chromosome aberrations. Sevelamer
hydrochloride was not mutagenic in the Ames bacterial mutation assay.

Sevelamer hydrochloride did not impair the fertility of male or female rats in a dietary administration
study in which the females were treated from 14 days prior to mating through gestation and the males
were treated for 28 days prior to mating. The highest dose in this study was 4.5 g/kg/day (human
equivalent dose 3 times the maximum clinical trial dose of 13 g).

### 14. CLINICAL STUDIES

#### 14.1 Active-Control, Cross-Over Study in Hemodialysis Patients

Eighty-four CKD patients on hemodialysis who were hyperphosphatemic (serum phosphorus
>6.0 mg/dL) following a two-week phosphate-binder washout period were randomized to receive Renagel and active control for 12 weeks. Average daily Renagel dose at the end of treatment was 5.9 g (range 0.8 to 14.3 g). There were statistically significant changes in serum phosphorus (p <0.001) for Renagel (1.6 mg/dL from baseline of 7.5 mg/dL), similar to the active control.

#### 14.2 Active-Control, Parallel Study in Hemodialysis Patients

Two hundred CKD patients on hemodialysis who were hyperphosphatemic (serum phosphorus >6.5
mg/dL) following a two-week phosphate-binder washout period were randomized to receive Renage,
800 mg tablets (N=99) or an active control (N=101). The two treatments produced similar decreases
in serum phosphorus. At week 52, using last observation carried forward, Renagel and active control
both significantly decreased mean serum phosphorus (by about 2 mg/dL) following a two-week phosphate-binder washout period. Patients started on treatment three times per day with meals.

### 16. HOW SUPPLIED/STORAGE AND HANDLING

#### Renagel®

(sevelamer hydrochloride) tablets are supplied as white, oval, film-coated, compressed tablets,
imprinted with RENAGEL 800 containing 800 mg of sevelamer hydrochloride. Renagel 800 mg
Tablets are packaged in bottles of 180 tablets.

1 Bottle of 180 ct 800 mg Tablets (NDC 58468-0021-1)


Do not use Renagel after the expiration date on the bottle.

[See USP controlled room temperature] Protect from moisture.

#### 17. PATIENT COUNSELING INFORMATION

Advise patients to report new onset or worsening of existing constipation or bloody stools promptly
to their healthcare provider (see Warnings and Precautions[5.1]).

Manufactured by: Genzyme Ireland Ltd.

For: Genzyme Corporation

Cambridge, MA 02142

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SEBH-FPLR-SL-APR20

Rx Only

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**Table 5: Mean Serum Phosphorus (mg/dL) at Baseline and Endpoint**

<table>
<thead>
<tr>
<th></th>
<th>Renagel (N=81)</th>
<th>Active-Control (N=83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline at End of Washout</td>
<td>8.4</td>
<td>8.0</td>
</tr>
<tr>
<td>Endpoint</td>
<td>6.4</td>
<td>5.9</td>
</tr>
<tr>
<td>Change from Baseline at Endpoint (95% Confidence Interval)</td>
<td>-2.0 (-2.5, -1.5)</td>
<td>-2.1 (-2.6, -1.7)</td>
</tr>
</tbody>
</table>

*p<0.001, within treatment group comparison*

The distribution of responses is shown in Figure 2. The distributions are similar for sevelamer
hydrochloride and active control. The median response is a reduction of about 2 mg/dL in both groups.

**Table 6: Mean Serum Phosphorus (mg/dL) and Ion Product at Baseline and Change from Baseline to End of Treatment**

<table>
<thead>
<tr>
<th></th>
<th>Renagel (N=94)</th>
<th>Active-Control (N=98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus Baseline</td>
<td>7.5</td>
<td>7.3</td>
</tr>
<tr>
<td>Change from Baseline at Endpoint</td>
<td>-2.1</td>
<td>-1.8</td>
</tr>
<tr>
<td>Ca × Phosphorus Ion Product Baseline</td>
<td>70.5</td>
<td>68.4</td>
</tr>
<tr>
<td>Change from Baseline at Endpoint</td>
<td>-19.4</td>
<td>-14.2</td>
</tr>
</tbody>
</table>

Sixty-one percent of Renagel patients and 73% of the control patients completed the full 52 weeks of
treatment. Figure 3, a plot of the phosphorus change from baseline for the completers, illustrates the durability
of response for patients who are able to remain on treatment.

**Figure 3: Mean Phosphorus Change from Baseline for Patients who Completed 52 Weeks of Treatment**

Average daily Renagel dose at the end of treatment was 6.5 g (range of 0.8 to 13 g).

### 14.3 Active-Control, Parallel Study in Peritoneal Dialysis Patients

One hundred and forty-three patients on peritoneal dialysis, who were hyperphosphatemic (serum
phosphorus >5.5 mg/dL) following a two-week phosphate-binder washout period, were randomized
to receive Renagel (N=97) or active control (N=46) open label for 12 weeks. Average daily Renagel
dose at the end of treatment was 5.9 g (range 0.8 to 14.3 g). There were statistically significant changes
in serum phosphorus (p<0.001) for Renagel (-1.6 mg/dL from baseline of 7.5 mg/dL), similar to the
active control.