## Antiretroviral Treatment Options for Patients on Directly Acting Antivirals for Hepatitis C

<table>
<thead>
<tr>
<th></th>
<th>Daclatasvir (Daklinza®, DCV)</th>
<th>Elbasvir/Grazoprevir (Zepatier®)</th>
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<th>Holkira Pak®/Viekira Pak® (US) (paritaprevir/ritonavir, ombitasvir 150/100/25 mg plus dasabuvir 250 mg BID</th>
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<td>60 mg daily with sofosbuvir 400 mg daily</td>
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<td>OK with atazanavir 300 mg QD.11, 12</td>
<td>Contraindicated due to ↑ risk of ALT elevations.13</td>
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<tr>
<td>PIs: atazanavir</td>
<td>↓ daclatasvir dose to 30 mg daily with atazanavir/ritonavir or atazanavir/ cobicistat.1,2</td>
<td>Contraindicated with atazanavir3: 10.58-fold ↑ grazoprevir AUC4 and 4.76-fold ↑ elbasvir exposures.5</td>
<td>Potential for ↑ tenofovir concentrations when administered with concomitant booster. Monitor for toxicity.6,8</td>
<td>OK with atazanavir/ritonavir9</td>
<td>Coadministration not recommended due to ↑ voxilaprevir concentrations.10</td>
<td>Darunavir/ritonavir: take without additional ritonavir; monitor HIV viral load due to decreased darunavir Ctrough (Canadian monograph).</td>
<td>Darunavir/ritonavir, lopinavir/ritonavir: coadministration not recommended due to ↑ glecaprevir and pibrentasvir.13</td>
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<tr>
<td>PIs: other</td>
<td>No dose modifications required with darunavir/ritonavir, darunavir/cobicistat or lopinavir/ritonavir.3</td>
<td>Contraindicated with darunavir, lopinavir, saquinavir, tipranavir3: 7.5-12.86-fold ↑ grazoprevir AUC4 and 0.66-3.7-fold ↑ elbasvir exposures.5</td>
<td>OK with darunavir/ritonavir, lopinavir/ritonavir.9</td>
<td>Darunavir/ritonavir: ↑ voxilaprevir AUC18 but considered safe.10</td>
<td>US monograph: Not recommended due to potential for decreased darunavir Ctrough.12</td>
<td>Tipranavir/ritonavir: Coadministration not recommended due to decreased DAA concentrations.10</td>
<td>Not recommended with lopinavir/ritonavir due to higher GI side effects and ↑ paritaprevir exposures.15</td>
</tr>
<tr>
<td>NNRTIs</td>
<td>↑ daclatasvir dose to 90 mg once daily with efavirenz.1</td>
<td>Contraindicated with efavirenz2: (84% ↓ grazoprevir</td>
<td>Efavirenz OK.18</td>
<td>Do not use with efavirenz (50% ↓ velpatasvir AUC).19</td>
<td>Coadministration with efavirenz not recommended due</td>
<td>Contraindicated with efavirenz (increased risk of adverse</td>
<td>Coadministration with efavirenz not recommended due</td>
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1. Antiretroviral Treatment Options for Patients on Directly Acting Antivirals for Hepatitis C

2. ASCP Antiretroviral Guidelines in Practice (AGIP), 2017

3. Darunavir/ritonavir:
- ↑ grazoprevir AUC4 and 0.66-3.7-fold ↑ elbasvir exposures.

4. Elbasvir:
- 100 mg/50 mg coformulation once daily

5. Grazoprevir:
- 100 mg/50 mg coformulation once daily

6. Ledipasvir:
- 90 mg once daily

7. Ledipasvir, saquinavir, tipranavir:
- 7.5-12.86-fold ↑ grazoprevir AUC4 and 0.66-3.7-fold ↑ elbasvir exposures.

8. Velpatasvir:
- 100 mg once daily

9. Velpatasvir:
- 100 mg once daily

10. Vosevi:
- 400/100/100 mg coformulation once daily

11. Vosevi:
- 400/100/100 mg coformulation once daily

12. Vosevi:
- 400/100/100 mg coformulation once daily

13. Vosevi:
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- 400/100/100 mg coformulation once daily

18. Vosevi:
- 400/100/100 mg coformulation once daily

19. Vosevi:
- 400/100/100 mg coformulation once daily

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**August 11, 2017**
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<td>*dosed as glecaprevir 300 mg/pibrentasvir 120 mg = 3 tablets once daily</td>
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Daclatasvir dose to 30 mg daily with cobicistat.In INSTIs

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- AUC\(^{16}\) and 54\% ↓ elbasvir AUC.\(^{17}\)
- Rilpirivine OK.\(^{18}\) Rilpirivine/FTC/TAF: OK.\(^{24}\)
- Rilpirivine OK.\(^{19}\) Rilpirivine OK.\(^{10}\)
- Not recommended with rilpirivine (116-273\% ↑ rilpirivine exposures).\(^{20}\)

- Elvitegravir/FTC/TDF: 40\% ↑ tenofovir AUC. Monitor for toxicity.\(^{9}\)
- Elvitegravir/FTC/TDF: 40\% ↑ tenofovir AUC. Monitor for toxicity.\(^{10}\)
- Do not coadminister elvitegravir/cobicistat since paritaprevir and ombitasvir are coformulated with ritonavir.

- Potential for ↑ tenofovir concentrations when administered with concomitant booster. Monitor for toxicity.\(^{7,8}\)
- Elvitegravir/FTC/TDF: 40\% ↑ tenofovir AUC. Monitor for toxicity.\(^{9}\)

- Avoid or use with caution until further data available.
- Etravirine contraindicated due to risk of decreased 3D exposures.\(^{12}\)
- Avoid or use with caution until further data available.

- No data. Coadministration not recommended with etravirine or nevirapine due to potential for ↓ daclatasvir.\(^{21}\)
- Not recommended with etravirine\(^2\) due to potential for decreased elbasvir and grazoprevir concentrations.
- Avoid or use with caution until further data available.
- Etravirine contraindicated due to risk of decreased 3D exposures.\(^{12}\)
- Avoid or use with caution until further data available.

- Potential for ↓ daclatasvir dose to 30 mg daily with elvitegravir/co/FTC/TDF due to increased elbasvir (2.2-fold increase) and grazoprevir (5.4-fold increase)
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**Concentrations.**

**Avoid with elvitegravir/co/FTC/TAF (as above).**

**Elvitegravir/co/FTC/TAF:** OK.

**Elvitegravir/co/FTC/TAF:** ↑ voxilaprevir AUC but considered safe.

**Maraviroc**

Standard doses of both OK.

**NRTIs**

Tenofovir DF OK.

Tenofovir DF OK.

Potential for ↑ tenofovir concentrations. Monitor for toxicity.

Potential for 40-81% ↑ tenofovir concentrations. Monitor for toxicity.

Potential for ↑ tenofovir concentrations. Monitor for toxicity.

Tenofovir DF OK.

Tenofovir DF OK.

Tenofovir DF OK.

Tenofovir DF OK.

Tenofovir alafenamide OK.

Tenofovir alafenamide OK.

Tenofovir alafenamide OK.

Tenofovir alafenamide OK.

**Key:**

- Red = avoid combination
- Yellow = caution/dose adjustment
- Green = combination OK

Co=cobicistat; FTC: emtricitabine; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate
References:


22. Taburet AM, Piroth L, Paniez H, et al. Pharmacokinetics of asunaprevir, daclatasvir and raltegravir in HCV/HIV co infected patients, with or without cirrhosis, and previously null responders to pegylated interferon + ribavirin (ANRS HC30 - QUADRIH study) [abstract 1967]. American Association for the Study of Liver Diseases The Liver Meeting (AASLD), November 7-11, 2014, Boston, MA.


