HIV treatment failure; ART toxicity & complications

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HIV treatment failure; ART toxicity & complications
Overall Outline

1. HIV & ART overview
   ◦ History, Epidemiology, transmission/risk, staging
   ◦ Med Class Overview, ART initiation

2. Treatment monitoring & Failure
   ◦ 2\textsuperscript{nd} & 3\textsuperscript{rd} line ART, toxicity/complications, monitoring
   ◦ Prevention

3. Opportunistic Infections & Hepatitis B
   ◦ OIs, ART considerations, Prophylaxis
   ◦ HBV dx, tx, surveillance, & HIV-HBV co-infection

4. Special Populations:
   ◦ Pregnancy, antenatal & intrapartum, infant care & pediatric

5. HIV/HBV Case-Based Application
   1. Case Application
   2. Wrap-up/review, miscellaneous items

5 session, 2 hours each
Source Materials

Liberia Integrated Guidelines for Prevention, Testing, Care, and Treatment of HIV and AIDS
- 5th edition, August 2019

WHO HIV Diagnosis, Treatment, and Opportunistic Infection Guidelines
- 2016, 2018 ART update

WHO Hepatitis B treatment guidelines (2015)

Reference Materials


Outline

Mechanism of Resistance & defining terms

Resistance Pathways for each ART class

Treatment failure: 2\textsuperscript{nd} & 3\textsuperscript{rd} line ART

ART adverse effects

ART drug-drug interactions
Case

34yo on EFV/TDF/3TC. She has lost 20 pounds in 6 months with diarrhea.

She discloses that she generally takes her meds 3-4 days a week. She misses medications on days when she travels to a nearby village to sell goods and leaves early in the morning.

Next step?

What findings and factors might prompt concern for resistance?
ART = Selective Pressure
Determines **Viral Fitness**

**Viral Population**
The most fit virus prevails at any given time point
Once resistance is selected it will **remain** in the population

---

**Foundations of Treatment Failure**

\[
\text{drug} + \text{Replicating virus} \rightarrow \text{Resistance}
\]

- **Wild-type drug sensitive HIV in an antiretroviral-naive person**
  - No drug pressure
- **Resistance emerging in a person on antiretroviral drug pressure**
  - No drug pressure in a person with resistant strains
- **Resistance re-emerges when drug pressure is re-applied**

**Antiretroviral Therapy**

- **Pre-Treatment**
- **Initial Response**
- **Adherence Problems**

**Plasma**

**Viral reservoirs**

Wild Type HIV
Resistant HIV
How resistance happens

- Poor adherence
- Insufficient drug level
- Viral replication in the presence of drug
- Resistant virus
- Treatment failure

Factors:
- Social/personal issues
- Regimen issues
- Toxicities
- Poor adherence
- Wrong dose
- Host genetics
- Poor absorption
- Rapid clearance
- Poor activation
- Drug interactions

Other factors:
- Suboptimal potency
- Host genetics

Transmission:
~10% in United States & Western Europe
Basic Resistance Model

Theoretical Zone of Selective Pressure

Probability of Resistance vs. ART Concentration

IC\textsubscript{50}  IC\textsubscript{90}  IC\textsubscript{99}
Virologic Suppression

Virologic Rebound

Incomplete Virologic Response

Viral Blip

Incomplete Virologic Response

Low Level Viremia
Terms

Successful ART

Potential Treatment Failure

Confirmed Treatment Failure

VL not detected

Routine VL detectable (even if < 1,000)

Targeted or repeat VL > 1,000

AND

Patient on NNRTI-based regimen*

AND

Good adherence for 3 months prior

*genotype for INSTI- or PI-based
Genetic Barrier to Resistance

**Genetic Barrier**
Number of mutations needed to confer resistance

- Number of mutations required to confer resistance
- Time until resistance
- Genetic Barrier to resistance
  - More “forgiving” regimen

**Non-Boostered PI**
Small Change per Mutation
- Low Drug Levels
  - Low Trough

**NNRTI**
High Drug Levels
- Large Change per Mutation
  - High Trough

**Boosted PI**
Small Change per Mutation
- AND
  - High Drug Levels
  - High Trough

Increasing Number of Mutations

Kuritzkes et al 2003; Bositis 2019
Cross-resistance

Resistance to 1 agent in a class → resistance to other agents in the same class

First generation NNRTI & INSTI
- High level of cross-resistance

NRTI
- Varies
  - emtricitabine (FTC) & lamivudine (3TC) = complete cross-resistance

PI & second-generation NNRTI
- Cumulative progressive resistance mutations expands cross-resistance
Adherence

“What challenges have you had taking your ARV?”

“What days / times are you most likely to forget your ARV?”

“Everyone has difficulty taking meds every day. When was the last time you were not able to take your ARV, and how many times in the past week, month were you unable?”

Root cause: there is always a reason (or reasons)

- Stigma & disclosure
- Socio-economic barrier
- Transportation & Work
- Psychological
- Misunderstanding
- Side effects

Goal: >95% adherence

Goal: to help the patient
- No policing
- Encourage transparency

Practical Strategies
- Join with daily routines (meal, cleaning)
- Cell phone alarm
- Take meds with another person
- Keep a med diary
Intensive Adherence Counseling (IAC)

for *any* sign of poor adherence
for any detectable Viral Load (even is <1k)
Patient & Treatment Supporter

Education on ART, adherence, monitoring, failure, & resistance

**Indentify Specifics**
- Travel, Work, Education
- Stigma, Privacy, Domestic Difficulties
- Substance Use
- Mental Health / Depression

**Action Plan**
- Specific
- Written on Patient Card
- Monthly appointments
  - Pill Counts
  - Action Plan review
- Viral Load in 3mo

**Stopping ART considered if:**
- Chronic poor adherence
- IAC counseling completed
- Shared decision making
Mutation Nomenclature

**Wild-type amino acid** → **codon position** → **mutant amino acid**

103 = codon (amino acid position)

**K** = Wild-type amino acid

**N** = Mutant amino acid

Reverse Transcriptase
NRTI Resistance Mechanisms

**Discrimination**
[decreased incorporation of NRTI into DNA strand]

**Excision**
[removal of NRTI from the DNA strand]
NRTI Resistance Pathways

**3TC**

- M184I > M184V

**Reverses** TAM-associated resistance to: *TDF & AZT*

*Resistance to: 3TC, FTC*

*Low level resistance to: ABC*

**TAM**

[thymidine analogue mutations]

**Cumulative Cross-Resistance Class-wide**

**AZT or d4T**

- K65R

**Resistance to: TDF, 3TC, ABC**

*^ Susceptibility: AZT*

**TDF or ABC**

**Co-occurrence worsens ABC + 3TC resistance**

**Decreases viral fitness**

**TDF – tenofovir**

**3TC – lamivudine**

**ABC – abacavir**

**AZT – zidovudine**

*Common in monotherapy*
Temporal Sequence of NRTI mutations

- **AZT/3TC** → **M184V** → **TAMs**
- **ABC/3TC** → **M184V** → **K65R**
- **TDF/3TC** → **M184V** → **K65R**

*Time*

*Slide Adapted from Bositis 2019*
Empiric NRTI Resistance

Monotherapy to TDF or 3TC (or PrEP with TDF/3TC)
- Likely M184V, possible K65R
- Assume resistance to TDF, 3TC, & ABC
- Unlikely TAM = use AZT

Confirmed virological failure
- Assume resistance to NRTIs in regimen & switch:
  - If on TDF or ABC → AZT
  - If on AZT → TDF/3TC

May always continue 3TC after failure
- Inducing M184V decreases viral fitness

Assume M184V / K65R
Resistance: 3TC, TDF, likely ABC

Assume Susceptibility to: AZT
*may give 3TC (AZT/3TC combo) or TDF
(to select for M184V/K65R to ^ AZT susceptibility)

Assume Resistance Class-Wide due to TAM

May give: TDF/3TC to induce M184V → ^ TDF susceptibility
NNRTI Resistance Mechanisms

**Low Barrier** to resistance
- **Pre-existing** mutations found in all ART-naïve patients are selected *quickly* – within 1 - 4 weeks!
- All NNRTIs bind in a *similar location*

**HIV-2** – intrinsically resistant to all NNRTI

**Reduced Access** to NNRTI-binding pocket

**Altered Interaction** with NNRTI-binding pocket
NNRTI Resistance Pathways & Empiric Approach

EFV – efavirenz
NVP – nevirapine

EFV

K103N -> Resistance to EFV + NVP
Highly fit virus

NVP

Y181C -> Resistance to NVP
Resistance to EFV quickly develops
No impact on viral fitness
Hypersensitive to AZT

EFV or NVP
failure

Class-wide Resistance
Stop NNRTIs
PI Resistance Mechanisms

Barrier to resistance is **HIGH**
1. darunavir / ritonavir
2. lopinavir / ritonavir
3. atazanavir / ritonavir

Multiple mutations generally needed for resistance
- Major – cause resistance
  - Many have cross-resistance
  - Often decrease viral fitness
- Minor – do not affect susceptibility but may enhance viral replicative capacity

Multiple Mutations
Generally required to alter enzymatic activity
PI Resistance Principles

Viral Resistance Mutations are Rare – Adherence / absorption predominates

Suspected Treatment Failure on Boosted PI → Intensive Adherence Counseling

Virologic Failure more likely if prior treatment experience with a different PI

Important to confirmed good adherence prior to viral load!
PI Resistance Pathways

**ATV/r**
- I50L
- **Resistance** to ATV
  > **Susceptibility** to other PIs

**LPV/r**
- Multiple mutations
- **Significant cross-resistance to ATV**

**DRV + r**
- I50V
- **Major Resistance** to DRV/r
  > Minor Resistance to LPV
  > **Susceptibility** to ATV

---

LPV/r  – lopinavir / ritonavir
ATV/r  – atazanavir / ritonavir
DRV + r – darunavir + ritonavir
Empiric PI Resistance

**ATV/r**
- **failure**
  - **Assume** I50L
  - *may trial LPV/r or DRV/r AND/OR INSTI
  - **Ensure good adherence**
  - **Genotype**

**LPV/r**
- **failure**
  - **Assume** ATV/r resistance
  - May trial DRV + r AND/OR INSTI
  - **Ensure good adherence**
  - **Genotype**

**DRV + r**
- **failure**
  - **Assume** I50V (LPV/r & DRV/r resistance)
  - Will need INSTI, ?ATV/r if no prior tx history
  - **Ensure good adherence**
  - **Genotype**
**INSTI Resistance Mechanism**

**High Barrier to Resistance**: Viral Resistance Mutations are Rare – Adherence / absorption *predominates*

**DTG**
- Highest barrier to resistance
  - Little cross-resistance to earlier INSTIs (elvitegravir [EVG] & raltegravir [RAL])
  - Very little phenotypic resistance seen even in patients on failing regimens

Time on regimen $\Rightarrow$ likelihood of resistance

---

**Image**: Diagram of HIV Integrase with labeled domains (NTD, CCD, CTD) and a scale showing amino acid positions 1 to 270.
If documented virologic failure:
ADD Boosted PI (DRV + r)
Change “Base”

Ensure good adherence

Genotype
Back to our case...

To refresh: missing about 50% of doses on EFV/TDF/FTC with diarrhea and weight loss over 6mo

- Next step?
- Then?
- Then?
Treatment Monitoring & Follow-up

**When to do VL**
- **Any of the following:**
  - Significant unintended weight loss
  - Failure to thrive
  - New or worsening HIV-related disease (suspected or confirmed)

**Result and Action**

**VL Result**
- Any detectable VL
- Below detection limit

**Interpretation**
- Potential Failure
- Successful ART

**Action**
- Intensive Adh. Support
- Continue current regimen

**VL Result (copies / ml)**
- **1000+**
- **Above DL but <1000**
- **Below detection limit (DL)**

**Current Regimen**
- 0 - 6
- 7 - 15

**Interpretation**
- Continued Failure
- Poor adherence or Failure
- Potential Failure
- Successful ART

**Action**
- Start 2nd Line
- Genotype testing
- Intensive Adh. Support
- Continue current regimen

**Collect VL Sample**
- Wait

**ART clinic visit**
- Less than 6 Months
- Between Milestones
- Around milestone (+1 to +12 months)

**Clinical Condition**
- **Well**
- **Not Well** *

**Ever had VL**
- **Ever**
- **Never**

**Never**
- **Ever**
- **Never**

**ART clinic visit**
- Less than 6 Months
- Around milestone (+1 to +12 months)

**Routine scheduled**

**VL >1,000 while adherent to ART**
- NNRTI-based
- Failure
- Switch to 2nd line (PI or INSTI)

**Boosted PI-OR INSTI-based**
- Poor adherence OR failure
- Genotype

**Targeted/Follow-up VL**
- VL >1,000 while adherent to ART
- NNRTI-based
- Failure
- Switch to 2nd line (PI or INSTI)

**Boosted PI-**
- OR

**INSTI-based**
- Poor adherence OR failure
- Genotype

**Potential Failure**
- Below detection limit

**Confirmed Failure**
- Intensive Adh. Support
- Continue current regimen

**Genotype**
- Start 2nd Line
- Genotype testing
- Intensive Adh. Support
- Continue current regimen
Definitions (review)

- **Successful ART**: VL not detected
- **Potential Treatment Failure**: Routine VL detectable (even if < 1,000)
- **Confirmed Treatment Failure**: Targeted or repeat VL > 1,000
  - AND
  - Patient on **NNRTI-based** regimen*
  - AND
  - **Good adherence** for 3 months prior
  - *genotype for INSTI- or PI-based
First Line ART

**START**

<table>
<thead>
<tr>
<th>Core</th>
<th>Backbone</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTG</td>
<td>TDF/3TC</td>
</tr>
<tr>
<td>EFV</td>
<td>TDF/3TC</td>
</tr>
<tr>
<td>NVP</td>
<td>AZT/3TC</td>
</tr>
</tbody>
</table>

**Not for START**

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<td>TDF/3TC</td>
</tr>
<tr>
<td></td>
<td>ABC/3TC</td>
</tr>
</tbody>
</table>

- Men 30kg
- Women 45yo +
- Women of childbearing potential "B+
- Patients < 30kg
Case (cont)

We have determined that our patient has a failed EFV/TDF/FTC regimen.

- What is your next step?
2\textsuperscript{nd} line ART

**Not for START**

<table>
<thead>
<tr>
<th>Core</th>
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</thead>
<tbody>
<tr>
<td>ATV/r</td>
<td>TDF / 3TC</td>
</tr>
<tr>
<td></td>
<td>AZT / 3TC</td>
</tr>
</tbody>
</table>

\[ \text{ATV/r} + \text{LPV/r} + \text{TDF} / 3TC \]

Core | Backbone
--- | ---
TDF / 3TC | ABC / 3TC
AZT / 3TC | AZT / 3TC

*1\textsuperscript{st} line START for < 3yo IF extra support
Case (cont)

Fast forward 3 years.
- Our patient who was switched to ATV/r/AZT/3TC now presents with a routine VL of 2,350

Next step?
Then?
Then?
3rd line ART

2 Core Agents

DRV + r + DTG*

*DTG is BID if INSTI resistance

Backbone

TDF / 3TC
ABC / 3TC
AZT / 3TC

Assumes likely resistance to at least 2 prior agents

- Assumes failure to prior treatment with core of:
  - ATV/r
  - LPV/r
  - DTG

- For likely NRTI resistance, “flip” the backbone (or follow genotype)
  - If failed on:
    - Switch to:
      - ABC or TDF → AZT
      - AZT → TDF
Our patient now on DRV/r/DTG/AZT/3TC presents with asymptomatic viral load of 1,230

- What do you think is going on here?
- What do you do?
Genotype Overview

Obtain for failure evaluation while on PI- or INSTI-based regimens

- **Rationale**: to differentiate resistance virus from poor adherence / low drug levels

*When to obtain a genotype*: while the patient is **taking failing ART with detectable virus**!

- Genotyping is sensitive to resistance mutations **only** if they are present in a minimum of ~20% of circulating virus at the time of the test
- In the **selective** presence of ART \(\rightarrow\) **mutant virus** is advantaged and present
- In the **absence** of ART \(\rightarrow\) **wild-type virus** is generally most fit and predominates

A patient with history concerning for prior virologic failure due to resistance is currently off ART.

- What are your next steps?
Obtaining & interpreting a Genotype

PCR -> averaged genetic sequence -> compared to wild-type

Stanford Resistance Database
Switching regimen (Table 10)

- **Contraindication to regimen**
- **Immediate significant adverse effect**
- **Troubling but tolerable side effect**
- **Failure to improve after 2 mo of continued ART & symptom management**
- **Switch to Alternative 1**
  - **Contraindication or adverse effect**
  - **Switch to Alternative 2**
Initial Treatment Failure (go to Alt 1)

- **NNRTI-based**
  - Confirmed virologic failure
  - ATV/r
  - If prior TDF/3TC
  - If prior AZT/3TC or ABC/3TC

- **ATV/r-based**
  - Confirmed virologic failure
  - DRV + r
  - DTG
  - If prior TDF/3TC
  - If prior AZT/3TC or ABC/3TC

- **LPV/r-based**
  - Confirmed virologic failure
  - genotype

- **DTG-based**
  - Confirmed virologic failure
  - genotype
  - ATV/r
  - If prior TDF/3TC
  - If prior AZT/3TC or ABC/3TC

- **AZT / 3TC**
- **TDF / 3TC**
2\textsuperscript{nd} line follow-up

Initial 6 months:
- Q 4 weekly visits

If stable, transition to Q 8 weekly visits

**EFV** or **NVP**

**Remember the “tail” if switching off these!**

EFV & NVP are present in decreasing concentration for 7 days after stopping

When stopping, give at least 7 days of fully active ART regimen to prevent EFV or NVP resistance from developing during the “tail”
ART Adverse Effects, medication interactions

These are **numerous**, and **difficult to remember**

- The *Liberian treatment guideline* has an excellent symptom-based guide to adverse effects and complications

For **medication interactions** – focus on a few high-yield culprits and forget the rest, just use:

[https://hiv-druginteractions.org/](https://hiv-druginteractions.org/)
Nucleoside Reverse Transcriptase Inhibitor (NRTI) – Adverse Effects & Caution

**Tenofovir [TDF]**
- Fully active against HBV
- Dose adjust if CrCl <50 (q48hr for CrI 30-49, q72 for 10-29)
- Renal Toxicity / Fanconi Syndrome
  - Glucosuria, proteinuria, aciduria, CKD, hyperphos, hypoK
- Osteoporosis
- Tenofovir alafenamide (TAF)
- Hypersensitivity reaction = absolute contraindication
- Increases cardiovascular disease risk
- No renal dose adjustment in CKD

**Lamivudine [3TC]**
- Well tolerated
- In all 1st & 2nd line regimens
- HBV-active but not preferred for mono-therapy
- Decrease dose for CrCl <50

**Abacavir [ABC]**
- Q 12 hour dosing
- Bone marrow suppression = anemia & leukopenia
- myopathy
- lipodystrophy
- Lactic acidosis (rare if not co-administered with stavudine)
- Dose adjust for CrCl <15 – take 300mg daily
Nucleoside Reverse Transcriptase Inhibitor (NRTI) – Adverse Effects & Caution (cont)

stavudine [d4t]

- Not included in Liberia 5th edition guideline
- Peripheral neuropathy
- Lactic acidosis (esp in combination with AZT)
- lipodystrophy
- dyslipidemia
Non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI) – Adverse Effects & Caution

**nevirapine [NVP]**
- Hypersensitivity reaction
  - Rash and/or hepatotoxicity, may be with fever, renal injury, mucous membrane involvement
  - Most common in women, those with HBV coinfection & high CD4
    - Caution if CD4 is:
      - >250 in women
      - >400 in men

**efavirenz [EFV]**
- Neuropsychiatric effects
  - Nightmares, depression, psychosis, ^ suicidality, headache
- Take at bedtime on empty stomach to minimize adverse effects
- ~15% erythematous maculopapular exanthema
- Hepatotoxicity – do not use if cirrhosis CTP Class B or C
- Unfavorable lipid profile effects
- Gynecomastia
- QTc prolongation

No renal dose adjustment!
Protease Inhibitor (PI) – Adverse Effects & Caution

**lopinavir / ritonavir [LPV/r]**
- Diarrhea
- Hyperlipidemia
- Liquid formulation is 40% alcohol by volume

**atazanavir / ritonavir [ATV/r]**
- Benign hyperbilirubinemia
- Nephrolithiasis

**darunavir + ritonavir [DRV+r]**
- Abdominal pain, diarrhea
- Rash (within 4wks of start, self-resolves)

**ritonavir [r]**
- Inhibits liver enzyme CYP3A
  - MANY drug-drug-interactions
- Diarrhea, nausea, abdominal pain

No renal dose adjustment!
Integrase Strand Transfer Inhibitor (INSTI) - Adverse Effects & Caution

**dolutegravir [DTG]**

- Mild side effects: headache, insomnia, nausea – generally self-resolve
- If known liver disease (ie, HBV) -> check LFTs before & after initiation
- BID with rifapentine for MTB treatment
- Neural tube defects if taken at conception
  - Tsepamo Study: NTD in 3/1,000 on DTG vs 1/1,000 on other ART
  - WHO now recommends DTG for use in women of childbearing age. Countries give varying recommendations.
- Increase in serum Creatinine (by ~0.15 on average) without CKD

**No renal dose adjustment!**
NNRTI & INSTI Key Drug-Drug Interactions

neyvirapine [NVP]
- DO NOT give with: rifampicin or rifapentine

dolutegravir [DTG]
- metformin should not exceed 1 gram total daily dose
- Separate from divalent cations (ie, iron, calcium, magnesium) – take DTG 2hrs before OR 6hrs after

efavirenz [EFV]
- DO NOT give with: simvastatin
- AVOID with: clopidogrel
- May decrease level of: atorvastatin
Boosted PI Key Drug-Drug Interactions

**Worst offenders!!**

### class-wide OR ritonavir

- **Statins**: 20mg atorvastatin max; NO simvastatin
- Variable effects on **warfarin**
- Most **anti-convulsants** lower PI, NNRTI, INSTI levels
- Do NOT give with: **rifampicin**, **rifapentine**
- Increases concentration of: **Beta-blockers** (except atenolol, labetalol) & **calcium channel blockers**

### atazanavir / ritonavir [ATV/r]

- **Antacids**: take ATV 2hrs before OR 1hr after antacid
- **H2 antagonist**: take with ATV/r OR 10hrs before ATV/r
- **PPI**: do not co-administer

### darunavir + ritonavir [DRV+r]

- **PPI**: max 40mg omeprazole

### lopinavir / ritonavir [LPV/r]

- No significant unique interactions
NRTI & NNRTI Switches by adverse effects

**Hypersensitivity Reaction:**
- AZT: fever, pain, emesis, cough
- ABC: fever, rash, hepatitis
- TDF: lactic acidosis
- EFV: neuropsychiatric, gynecomastia, hepatitis/rash

Any suspected hypersensitivity reaction = STOP the ART & DO NOT re-challenge

Give dizziness, drowsiness & nightmares 4 weeks to resolve.
PI & INSTI Switches by adverse effects

Jaundice (benign if only indirect bilirubin is elevated)

ATV/r → LPV/r

Diarrhea, vomiting, headache, dizziness

LPV/r → ATV/r

Headache, insomnia, diarrhea, hepatitis

DTG → EFV
## Start by clinical scenario

<table>
<thead>
<tr>
<th>Condition</th>
<th>Timing of ART start</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemia (&lt;8g/dl)</td>
<td>NOW</td>
<td>DTG / TDF / 3TC Pedi: DTG + ABC / 3TC</td>
</tr>
<tr>
<td>Active MTB</td>
<td>Within 14 days</td>
<td>DTG / TDF / 3TC Pedi &lt;30kg: EFV</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Initial evaluation first</td>
<td>EFV / TDF / 3TC DTG only if severe liver dz &amp; HBV/HCV ruled out</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>Within 7 days</td>
<td>NVP + ABC/3TC</td>
</tr>
<tr>
<td>Psychiatric Illness History</td>
<td>NOW</td>
<td>DTG / 3TC / TDF NVP + TDF / 3TC</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>NOW</td>
<td>DTG / TDF / 3TC</td>
</tr>
<tr>
<td>New HIV+ in labor</td>
<td>NOW</td>
<td>DTG / TDF / 3TC</td>
</tr>
</tbody>
</table>
Cases

55yoM with CKD recently started on DTG/ABC/3TC develops a cough and vomiting 2 weeks after starting.
- What is going on? Do you switch ART, and if so to what?

23yoF planning pregnancy soon sees you in clinic for new HIV diagnosis & ART start.
- How do you counsel her on ART options?

34yoF presents with suicidal ideation after starting ART recently. She does not know her meds and medical records are missing.
- What ART might she be on, and what do you suggest?
Cases

59yoM with HTN on NVP/TDF/3TC presents with 20lb weight loss and polyuria over 3 months.
  - What do you suspect? What studies do you order? What is your recommendation?

63yoF on NVP/AZT/3TC notes an increasingly protuberant abdomen and thinning facial soft tissue.
  - What do you suspect? What is your recommendation?

33yoM on NVP/TDF/3TC has VL 2,350 after IAC and 3 months of good adherence.
  - What is your recommendation?

43yoF on LPV/r/TDF/3TC with chronic diarrhea without weight loss for 3 months.
  - What do you suspect? What is your recommendation?
References


