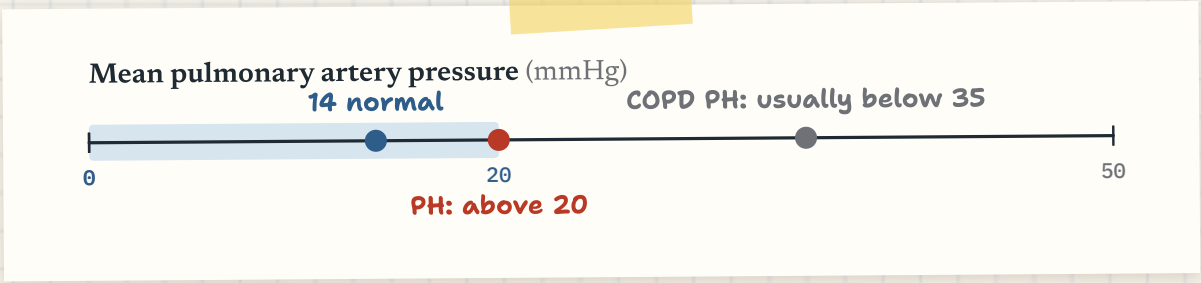
HPV and cor pulmonale

One reflex: helpful locally, harmful across the whole lung



Step by step

1. Low O_2 inhibits Kv channels
2. Less K^+ leaves; cell depolarises
3. L-type Ca^{2+} channels open
4. Ca^{2+} enters; vessel constricts
5. Chronic: thickened, muscularised arteries

Hypoxia	Result
One patch	Blood diverted; V/Q matched; e.g. shunt 20% → 10%
Whole lung (COPD)	Constriction + remodelling; resistance rises
Pre-capillary PH	Mean PAP above 20 mmHg; wedge 15 mmHg or below
Right ventricle	Hypertrophies (cor pulmonale), then dilates and may fail

Local versus whole-lung hypoxia

Rule of thumb

Local hypoxia: diverts blood, matches V/Q

Whole-lung hypoxia: raises resistance

RV hypertrophy from lung disease = cor pulmonale

Exam traps

- Right failure from left heart disease is not cor pulmonale.
- Cor pulmonale is not simply right heart failure.
- Lung disease gives pre-capillary PH: the wedge pressure is normal.
- In COPD, PH is usually mild to moderate: below about 35 mmHg.

Hypoxic pulmonary vasoconstriction and cor pulmonale

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/respiratory-physiology/hypoxic-pulmonary-vasoconstriction-cor-pulmonale

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