

METHYLXANTHINES

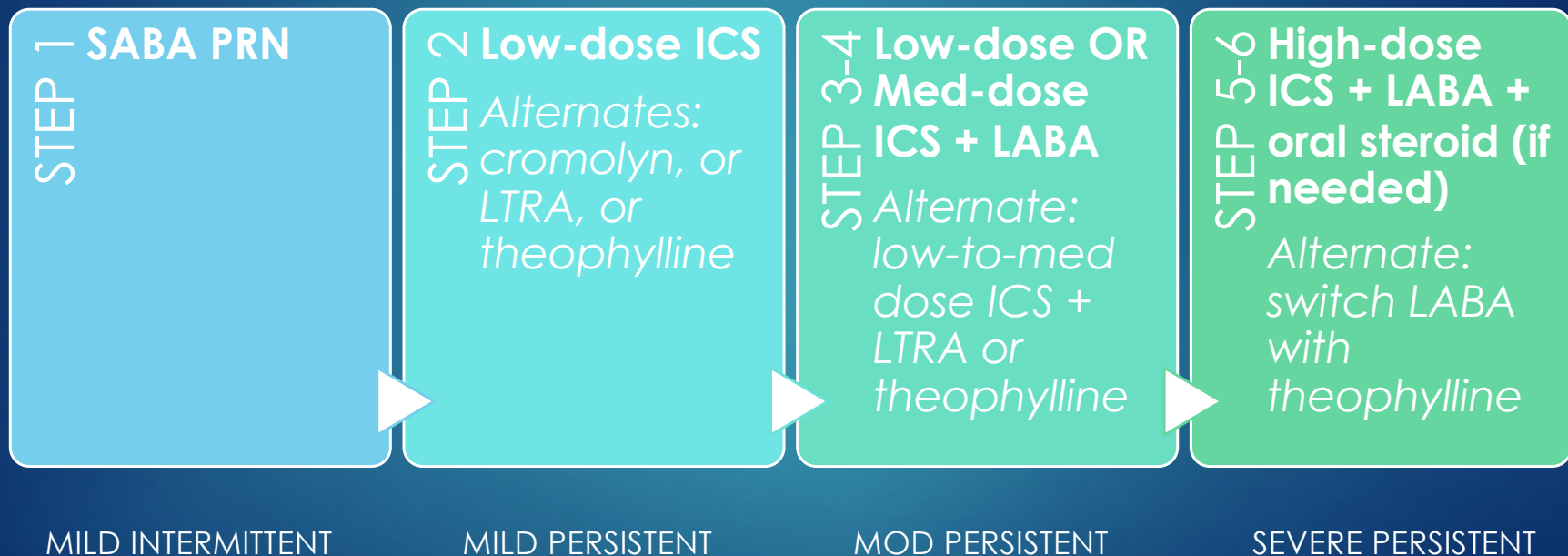
FLAME LECTURE: 32

GRZYCH 8.19.19

LEARNING OBJECTIVES

- ▶ To understand the use of methylxanthines in the management of asthma
- ▶ To describe the mechanism of action and side effects of methylxanthines
- ▶ Prerequisites
 - ▶ NONE
- ▶ See also - for closely related topics
 - ▶ Other FLAMES on asthma

REVIEW OF MAINTENANCE MGMT



AVAILABLE METHYLXANTHINES

- ▶ Can be used in Steps 2-6 of maintenance asthma management
 - ▶ Theophylline (Theo-24, Uniphyl)
 - ▶ Dyphylline
 - ▶ Aminophylline

MECHANISM OF ACTION

- ▶ Inhibition of phosphodiesterase → ↓ cAMP hydrolysis → activates PKA → inhibits $\text{TNF}\alpha$ → and inhibits leukotriene synthesis
 - ▶ Acts as a direct bronchodilator at higher doses
 - ▶ At lower doses, is weak bronchodilator
- ▶ Adenosine receptor antagonism
 - ▶ Which also leads to bronchodilation and airway smooth muscle relaxation
 - ▶ Also antagonizes A1, A2, and A3 receptors almost equally, which explains many of its cardiac effects

MONITORING

- ▶ Theophylline blood levels should be monitored periodically
 - ▶ Should be within therapeutic range (10-20 mcg/mL of plasma)
 - ▶ Narrow therapeutic index
- ▶ Toxicity with increasing levels:
 - ▶ Nausea/vomiting/diarrhea
 - ▶ Seizures (resistant to anticonvulsants)
 - ▶ Tachycardia / Flutter → Arrhythmia → Myocardial infarction
 - ▶ Urinary retention

IMPORTANT LINKS AND REFERENCES

- ▶ <http://step1.medbullets.com/respiratory/117041/asthma-drugs>
- ▶ www.aafp.org/afp/2016/0915/p454.html
- ▶ www.drugs.com/drug-class/methylxanthines
- ▶ www.aafp.org/afp/2016/0915/p454.html
- ▶ www.theasthmacenter.org/index.php/disease_information/asthma/medical_treatment_of_asthma/methylxanthines_theophyllines/
- ▶ http://link.springer.com/chapter/10.1007/978-3-642-13443-2_17