Disordered physiology of the gastrointestinal tract during critical illness: An overview for the general physician

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Topics to cover

1. Disordered oesophageal physiology in the critically ill

2. Pro-kinetics in the ICU: Are the benefits worth the risks?

3. Tight blood glucose control. How tight is too tight?

1. Disordered oesophageal physiology in the critically ill; why do patients receive ventilation in the semi-recumbent position?

Disordered oesophageal physiology in the critically ill

- Reflux occurs in 90% of mechanically ventilated critically ill patients
- Mechanism different to normal physiology

Mechanism of GOR in normal physiology

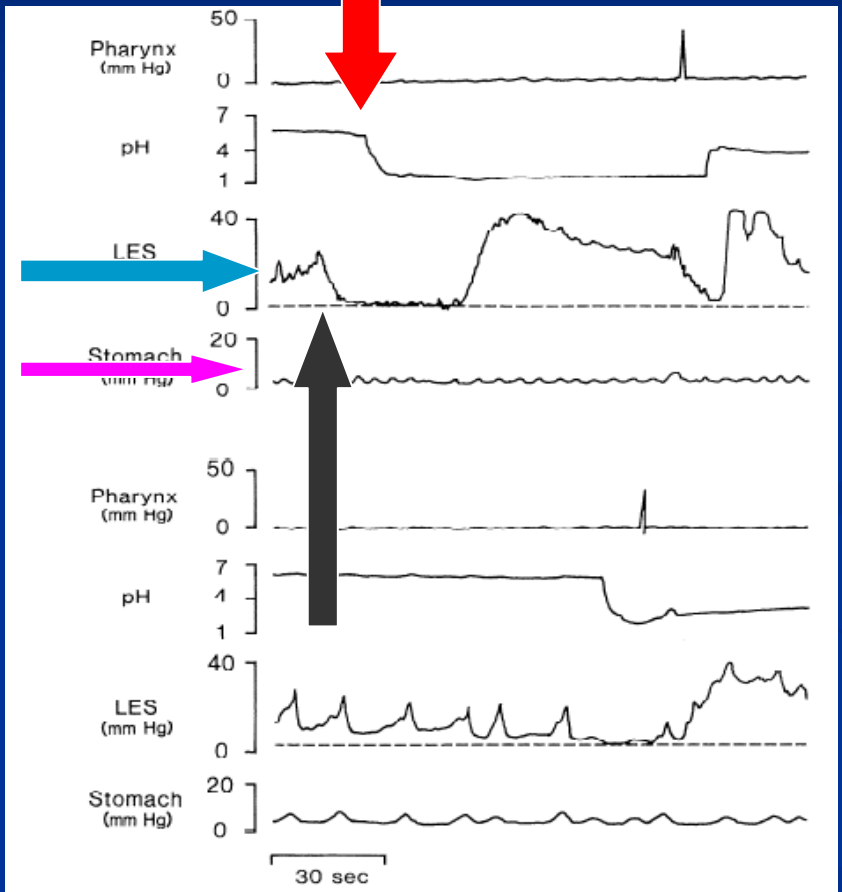
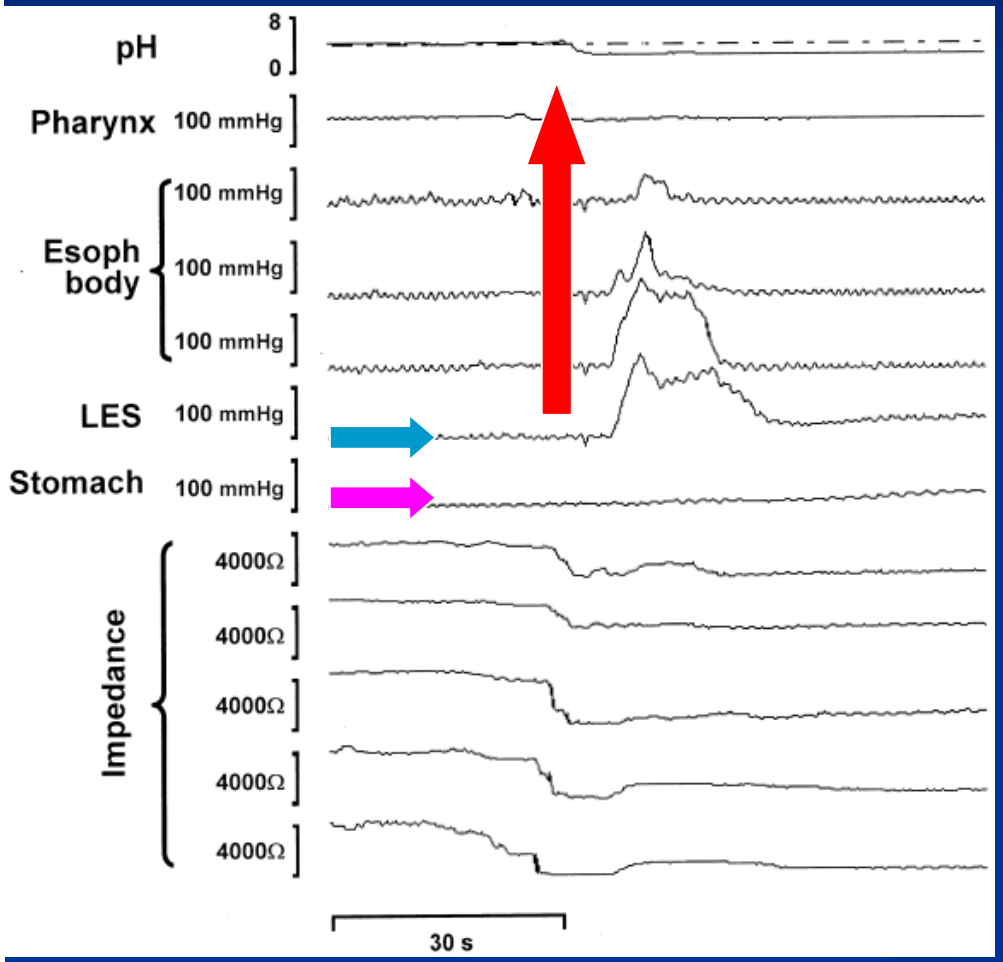
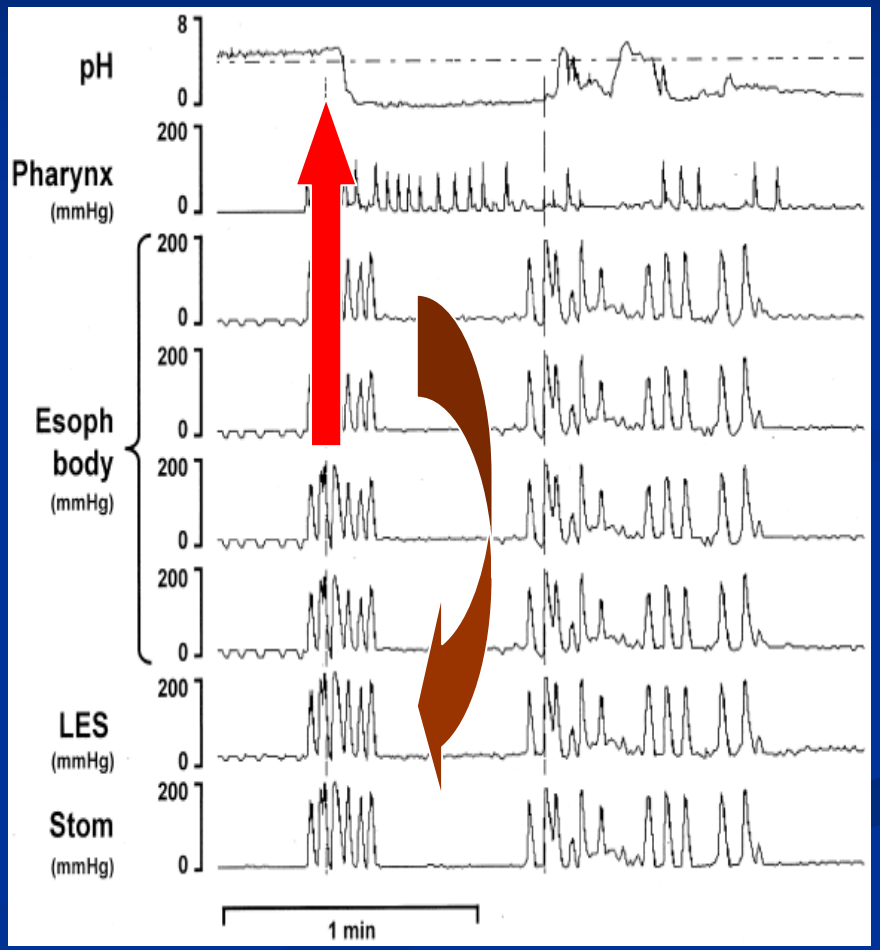


Fig. 4. *Top*: examples of spontaneous LES pressure fall associated with reflux, judged by visual analysis to be transient LES relaxation, followed by dry swallow-induced LES relaxation. Note substantially longer duration of transient LES relaxation. *Bottom*: example of slow downward drift in LES pressure.

Holloway Am J Physiology 1995

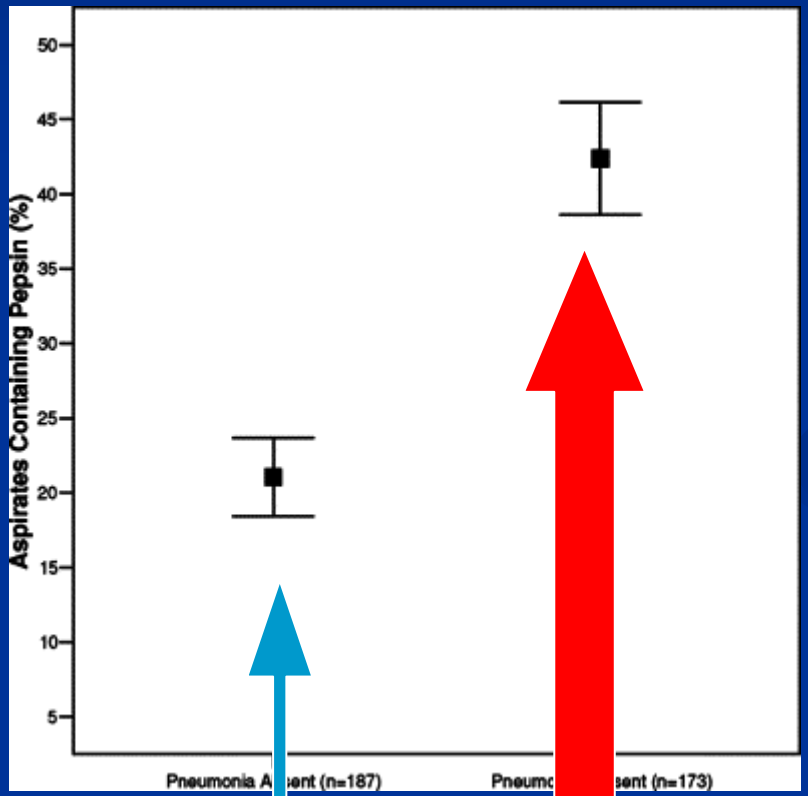
Mechanism of GOR in the critically ill





GOR, aspiration and pneumonia

Aspiration events



n=320

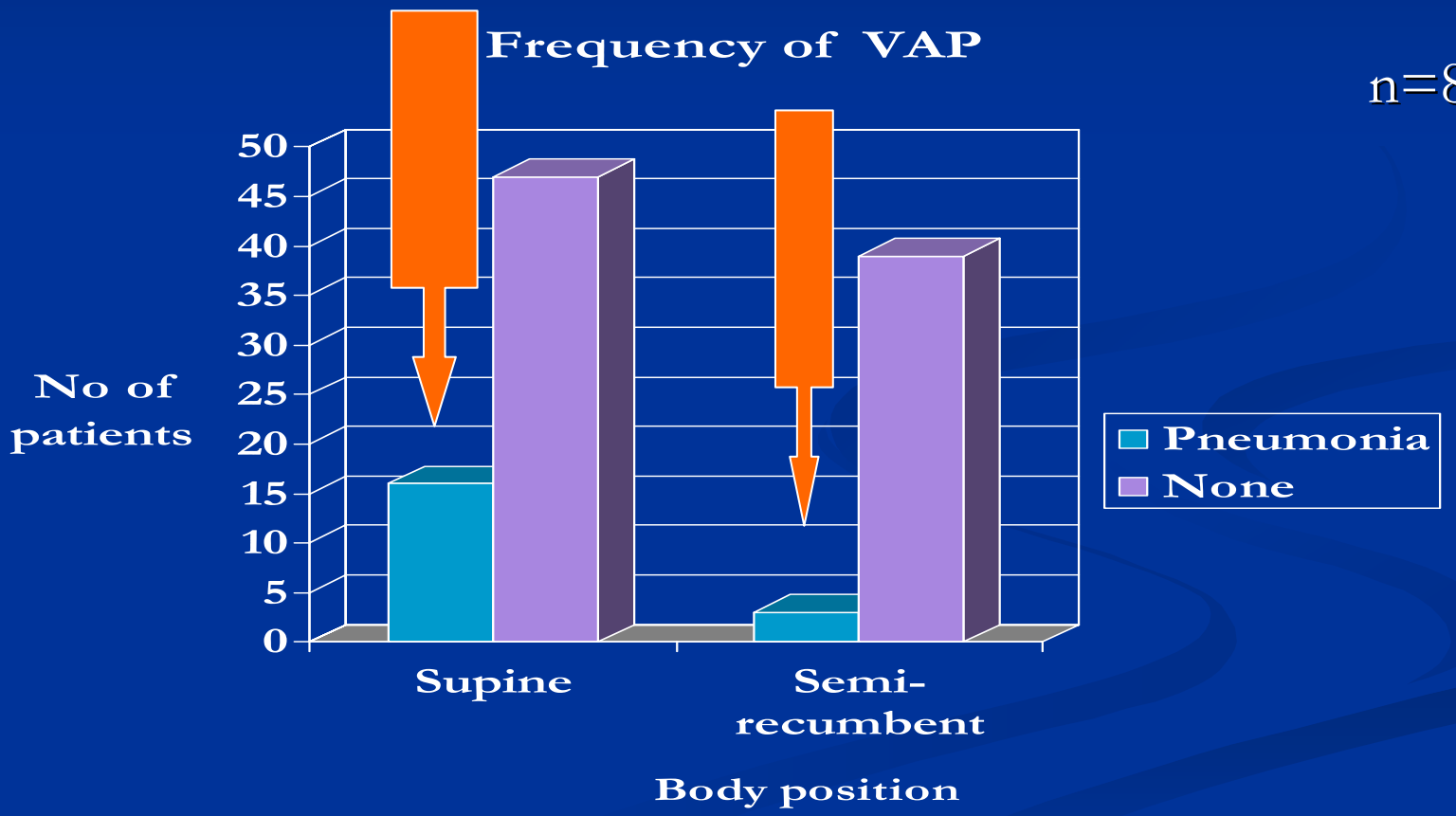
Tracheal samples 5857

Pneumonia Absent

Developed Pneumonia

Metheny CCM 2006

Decrease episodes of Ventilator Associated Pneumonia (VAP)



Drakulovic Lancet 1999

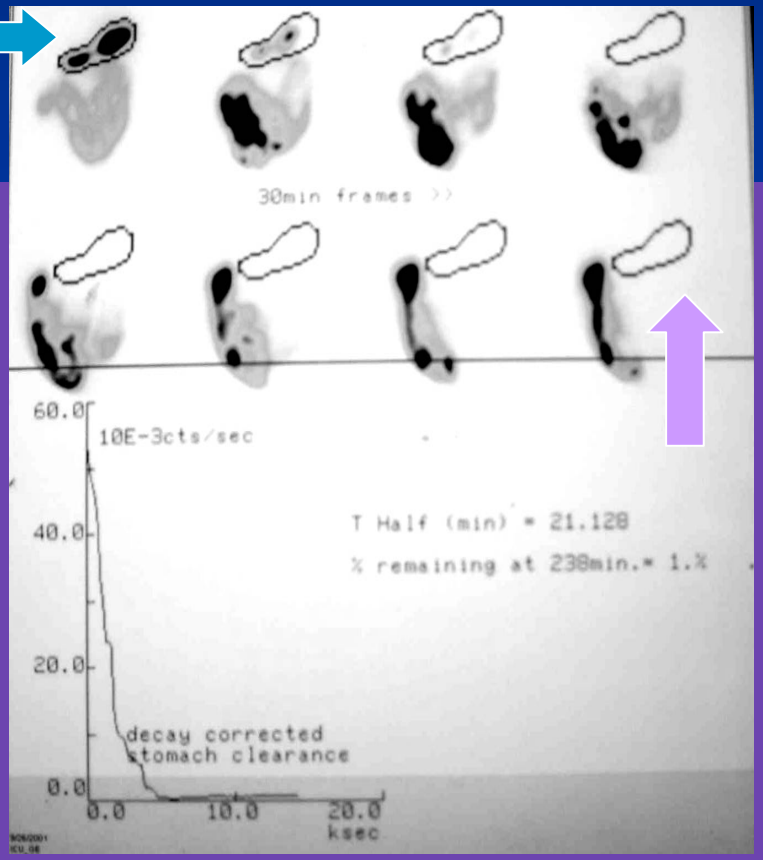
SUMMARY

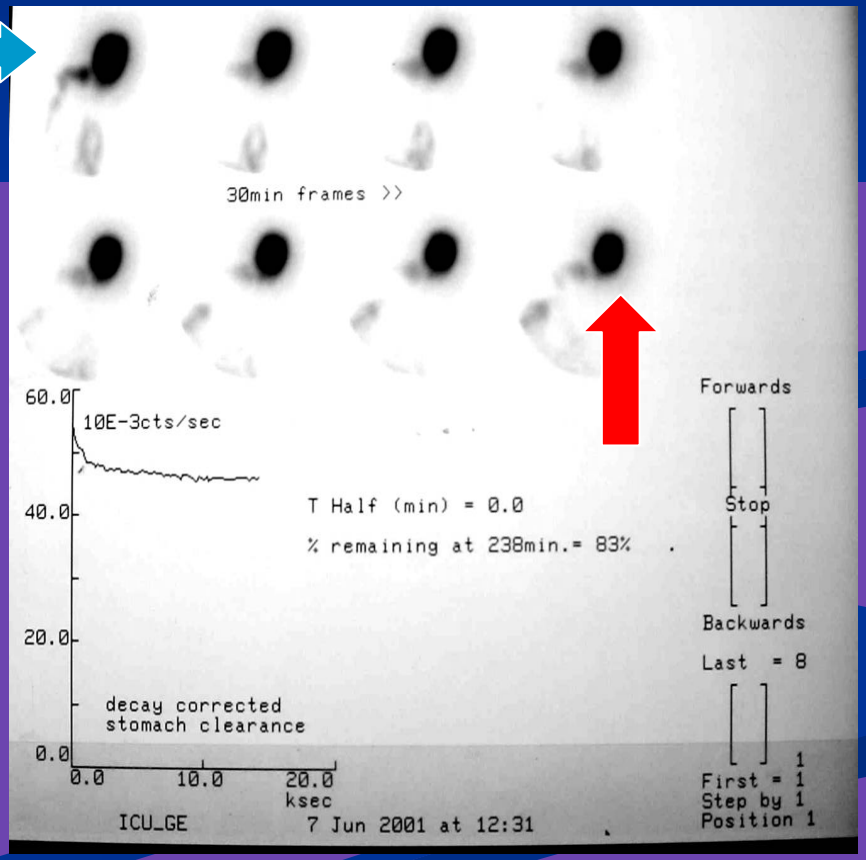
- Reflux is common
- Associated with Pneumonia
- Caused by low or absent LOS pressure
- Ventilation in the semi-recumbent position decreases frequency of pneumonia

2. Current drug treatment of feed intolerance in the critically ill. Pro-kinetics: Are the benefits worth the risks?

Delayed Gastric Emptying in the critically ill

Gastric emptying measured by scintigraphy





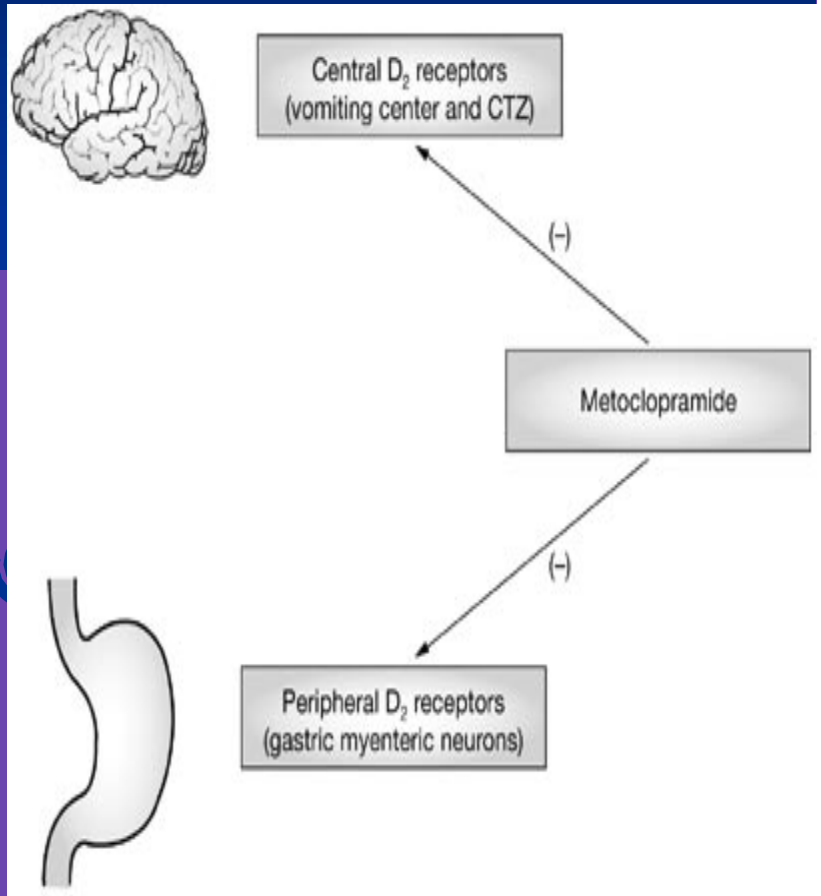
Normal Physiology

Critically ill patient

Chapman

Drug treatment for delayed gastric emptying

- Metoclopramide
  - How it works
  - Does it work?
  - Adverse Events?



Pasricha PJ *et al.* (2006)

nature CLINICAL PRACTICE GASTROENTEROLOGY & HEPATOLOGY

Drug treatment for delayed gastric emptying

Erythromycin

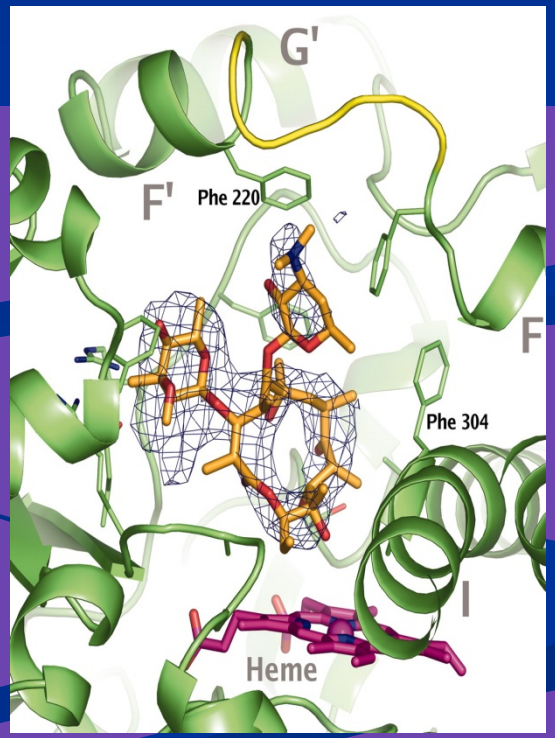
How it works?

Does it work?

Adverse Events?

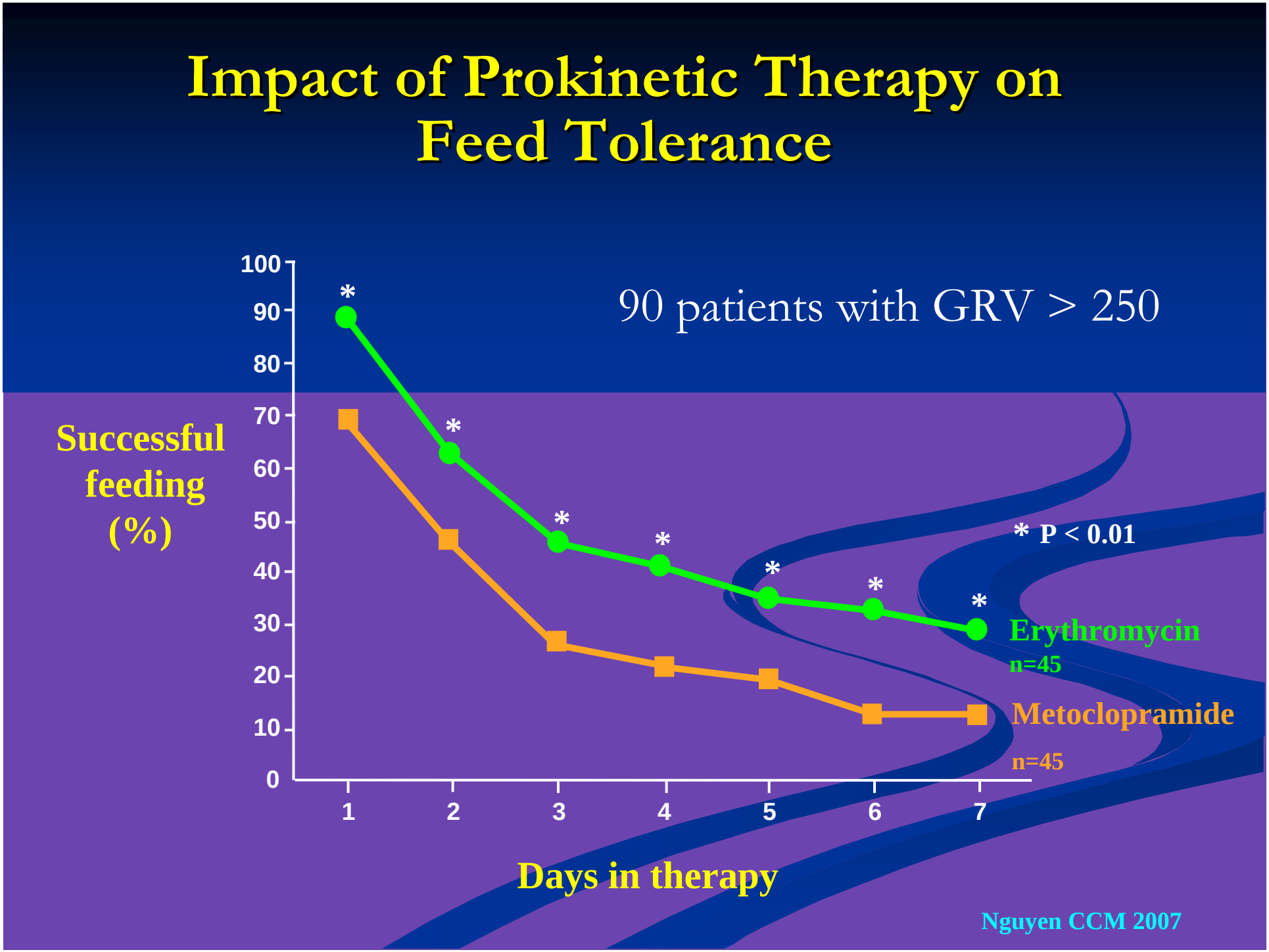
Antibiotic Resistance
Drug interactions
Cardiac Arrhythmia
Diarrhoea
Absorption?

Fig. 4. Erythromycin binding to CYP3A4

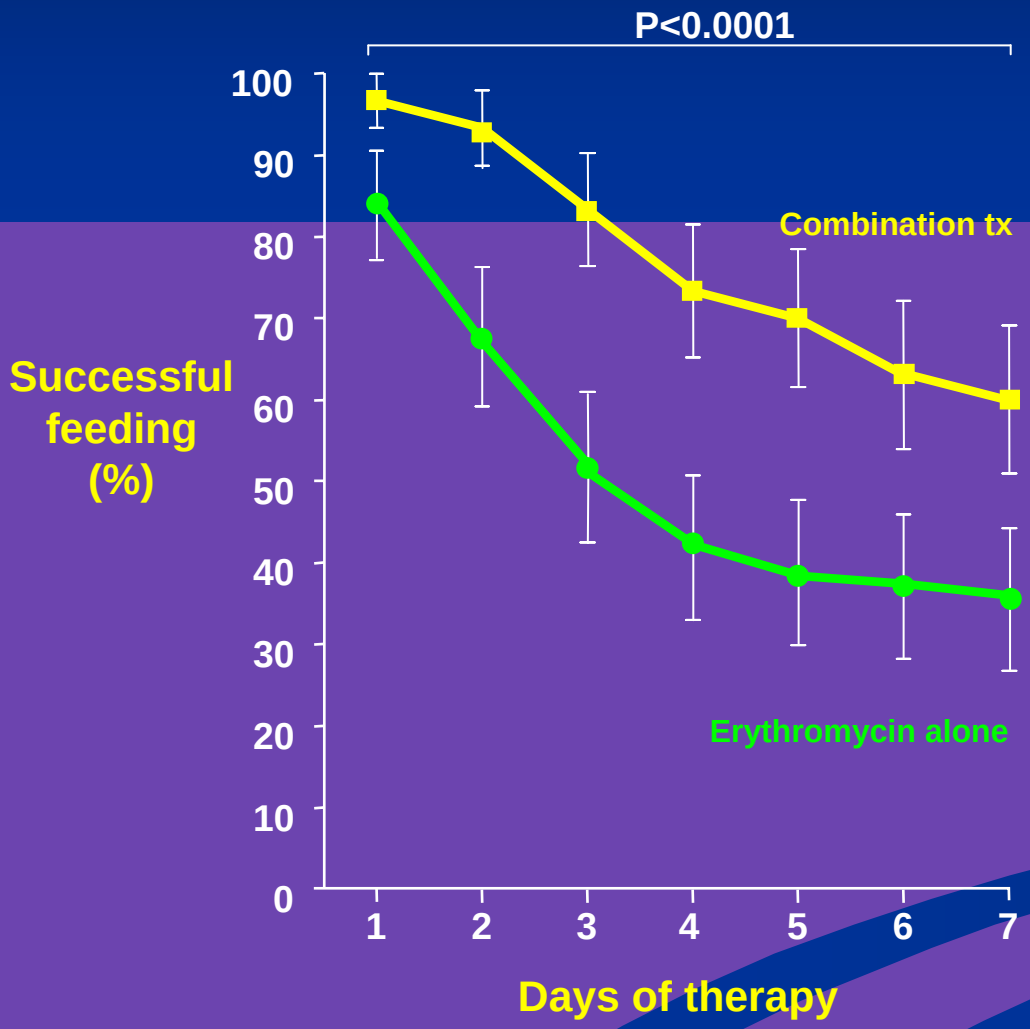


Ekroos (2006) Proc. Natl. Acad. Sci.

Impact of Prokinetic Therapy on Feed Tolerance



Combination therapy improved feed tolerance compared to erythromycin alone



n=75

Feed intolerant ventilated patients

Nguyen CCM 2007

Summary

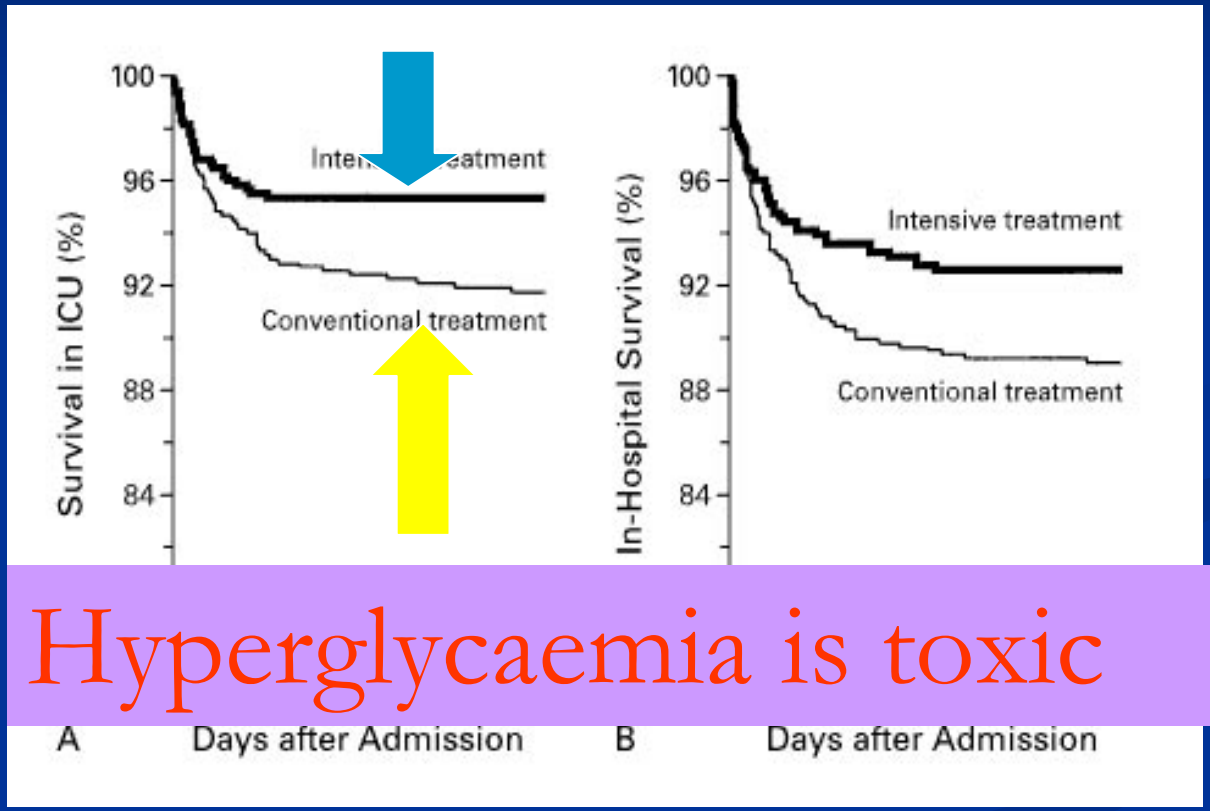
- Delayed GE is common
- Magnitude of gastroparesis
- Associated under-feeding +/- aspiration
- Drug adverse events are under-reported
- Combination Therapy is first line for feed intolerance
- Length of treatment?

3. Intensive insulin therapy and tight blood glucose control

How tight is too tight?

How tight is too tight?

Lower mean blood glucose concentrations associated with less deaths compared to very high mean blood glucose concentrations

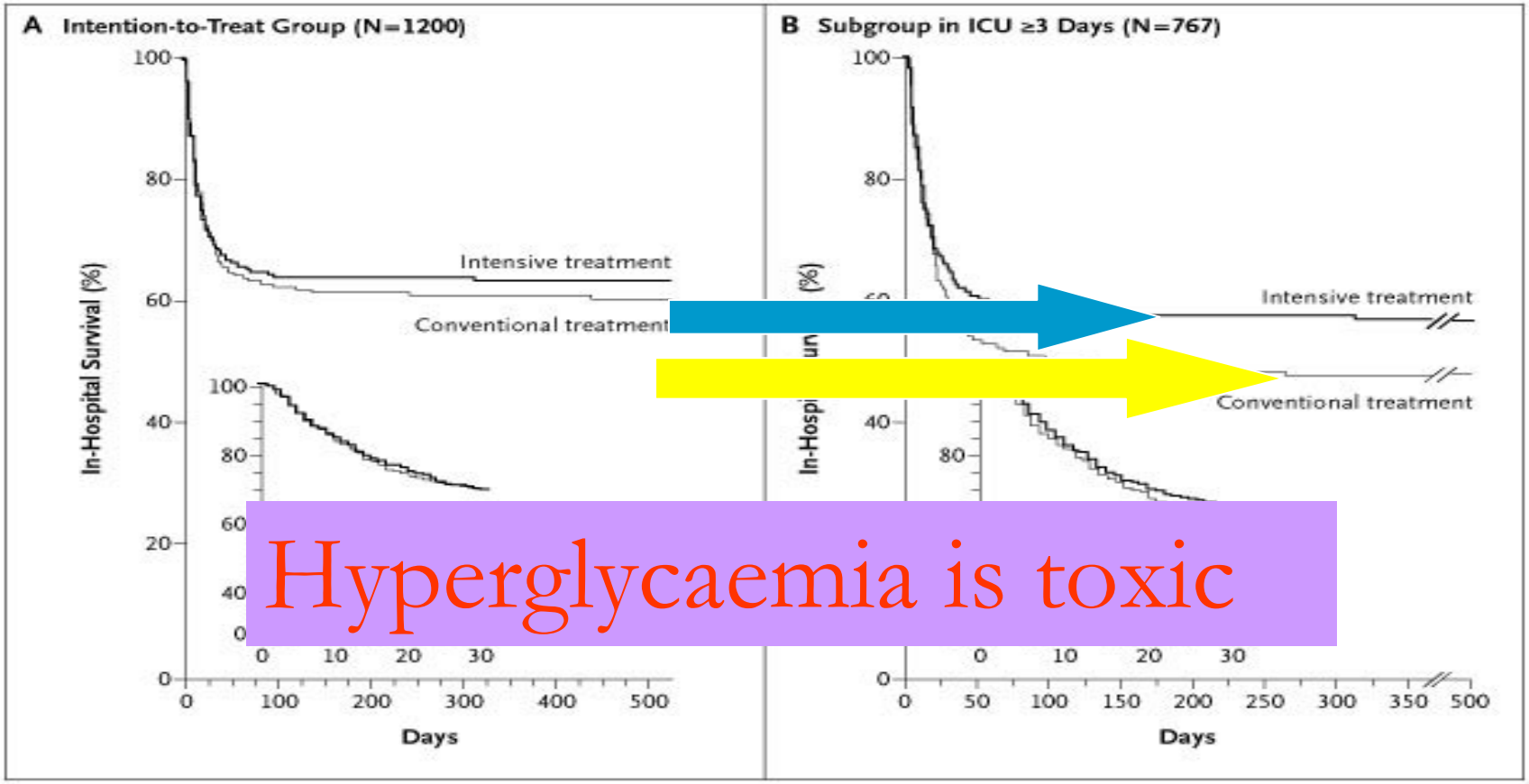


Hyperglycaemia is toxic

Van den Berghe NEJM 2001

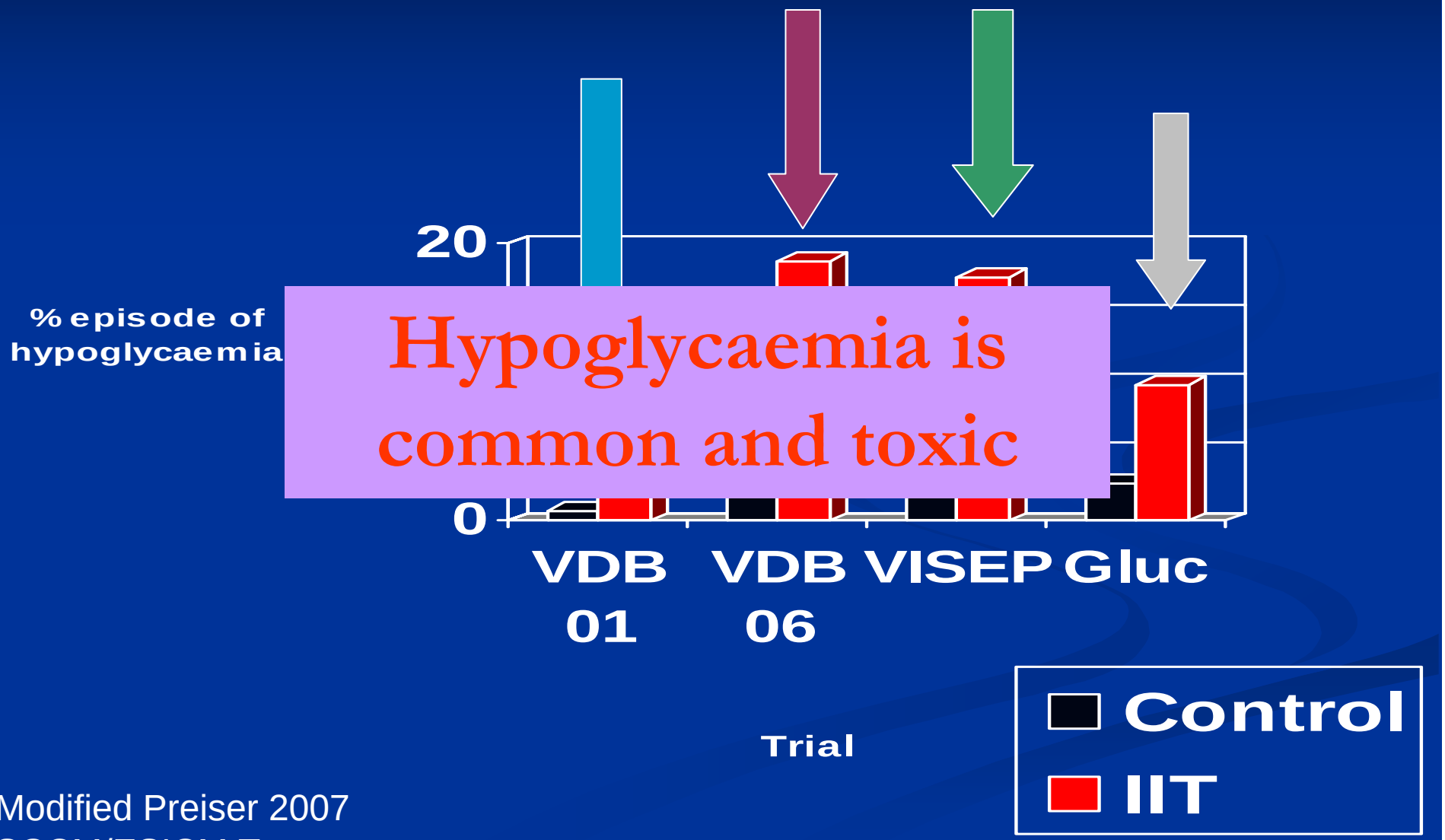
Intensive insulin therapy in the medical ICU

Intention to Treat **Subgroup in ICU > 3 days**



Van den Berghe NEJM 2006

Prevalence of hypoglycaemia in trials of intensive insulin therapy



Hypoglycaemia is common and toxic

Modified Preiser 2007
SCCM/ESICM Toronto

Current Research

- Insulin Protocols and patient variability
- Normoglycaemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation (NICE-SUGAR)

Summary

- Hyperglycaemia is toxic
- Hypoglycaemia is common with intensive insulin therapy and is toxic
- Limitations to protocols
- Best available evidence for Australian critical care should be available soon

Take-home summary

- Critically ill patients should be ventilated **at least** 30 degrees head up unless contraindicated
- For GRV > 250ml first line pro-kinetic drug therapy is erythromycin and metoclopramide
- Keep blood glucose concentrations in the range 4.1-10 mmol/L. Avoid hypoglycaemia and await the NICE-SUGAR Trial

For a copy of slides or transcript of presentation please email:

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