

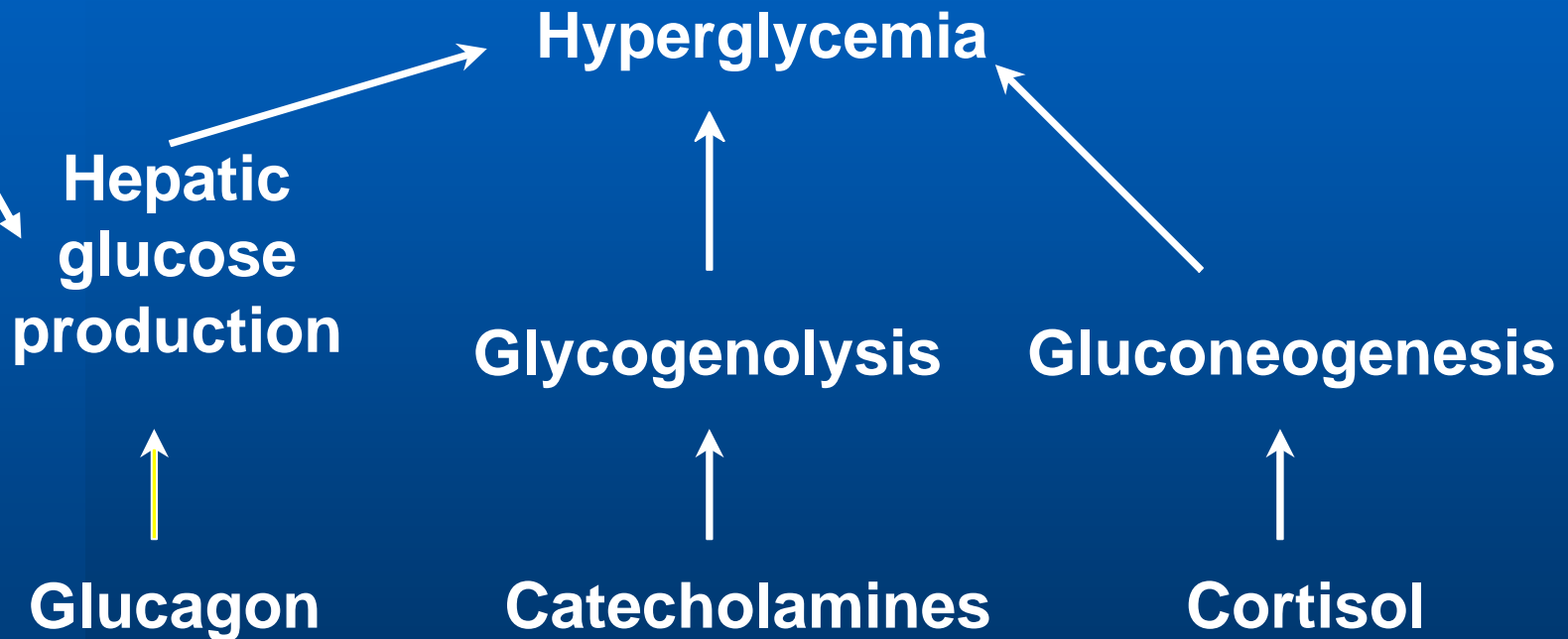
Improving Blood Glucose Control in the Cardiovascular Intensive Care Unit- Developing an Evidence-Based Protocol

Lori Hadas, MSN, RN, CCRN
Cardiovascular Clinical Nurse Specialist
Florida Hospital, Orlando

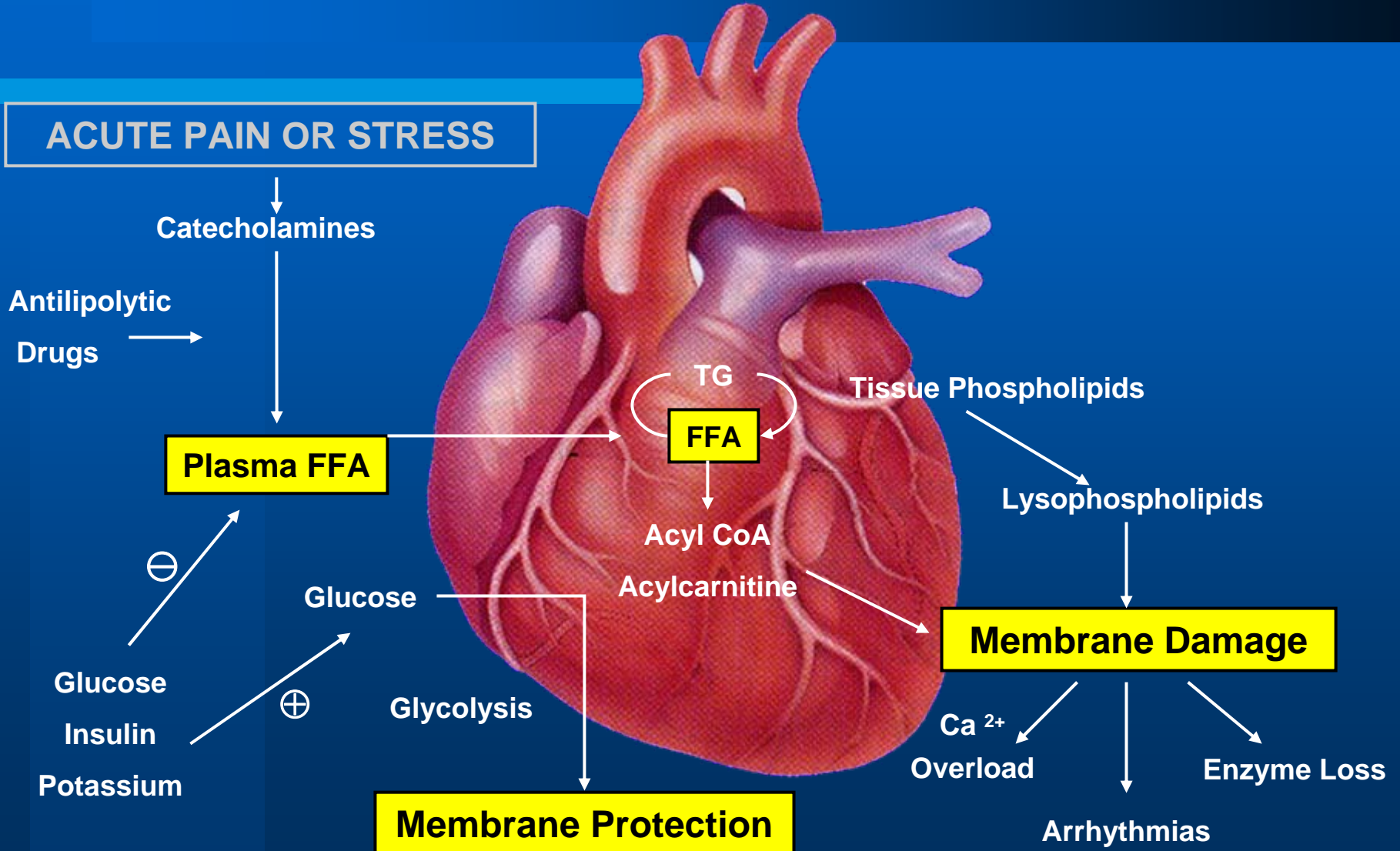


Understanding the Physiologic Effects of Surgery and Hyperglycemia

Lipolysis



Mechanism of Fatty Acid Toxicity and Metabolic Intervention



Hyperglycemia and Infection Risks

- Insulin resistance resulting in poor blood glucose control post-op
 - Dehydration/ Fluid Shifts/ Electrolyte Disturbances/ Arrhythmias
 - Poor nutritional status
 - Changes in bacteria on skin, leading to infection
- Long term complications
- vascular insufficiency
 - neuropathy

Project Goals

- Increase awareness of the need for glycemic control for the cardiac surgical patients
- Decrease treatment variation of hyperglycemia (physician protocols and nursing titration skills)
- Provide standard guidelines for insulin therapy



Where to Begin?

- Developed a multidisciplinary team
- Focus to identify and implement evidence best practices
- Followed PI format:
 - Assess
 - Plan
 - Implement
 - Evaluate
- Team Leader: CV CNS
- 2 Diabetes CNSs
- Endocrinologist, CV Surgeon, Anesthesiologists
- IM, CC Intensivist
- PharmD, Dietitian
- CVICU/ CVPCU/ OR Nurses
- POC/ Laboratory
- PI Team

Assess

- Current practice
 - Insulin given IV push or IV drip
 - No consistent goal or titration
- Best practice
 - Insulin IV drip
 - Consistent goal and titration
- Project Outline
- Review of literature
- Gathered protocols
- Selected outcome indicators
- Reviewed patient records for baseline data

Plan

- Protocol Development
 - Diabetic patients having cardiac surgery
 - Weight-based
 - Dextrose infusion
 - 48 hours post-op
 - 110 - 150 range
- Established outcome criteria
- Planned/ developed educational material
- Developed time line for implementation

Plan

Process Development

- Identified diabetic patients in OR Holding
- Initiate protocol if BG > 150 mg/dl
- Continue protocol through the OR case
- Patient to CVICU on protocol
- Patients on insulin infusion x 48 hours
- Transition off infusion
- Education completed

Plan

- Barrier Resolution

- Identify diabetic patient in OR holding
 - Insulin and Dextrose bags to OR Holding
 - IV pumps delivered to OR Holding daily
 - IV pump inservices to anesthesiology
 - IV pump tubing and supplies, including protocol packets readily available in Holding
- Provide 1:1 support in OR during trials
 - CV CNS and CVICU staff nurse

Implement

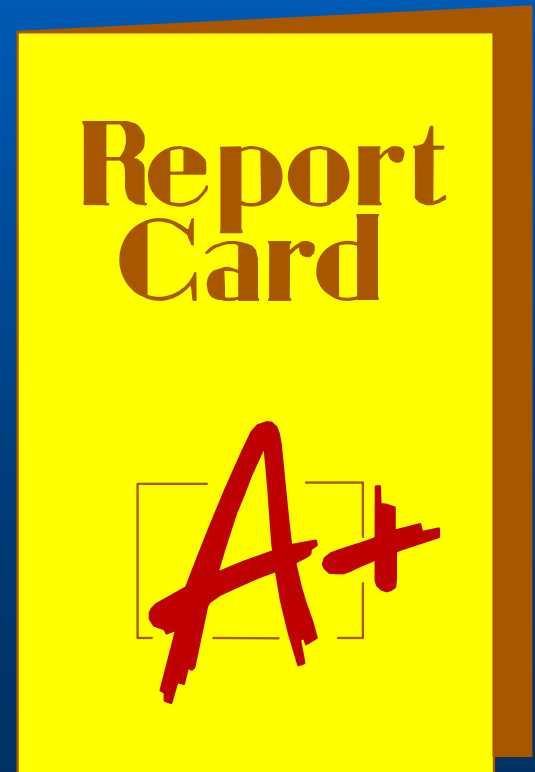
- OR Barriers
 - Increased workload for anesthesiologists
 - Busy OR environment for Q 1 hour BG levels
 - Unfamiliar with IV pumps
 - Complex protocol to learn
 - Not enough OR circulators
- Nursing Barriers
 - Increased workload for nurses
 - Complex protocol

Implement

- Selected trial patients
 - Direct supervision in OR Holding, OR and CVICU
 - Analyzed diabetic flowsheets
 - Revised protocols accordingly
 - Monitored closely for hypoglycemia
 - Errors? Protocol clarification? Compliance?

Evaluation

- Selected outcomes
 - Average blood glucose
 - OR
 - DOS
 - POD 1
 - POD 2
 - Wound infection
 - Deep Sternal
 - Hypoglycemia (BG < 50)



Evaluation

- Average blood glucose levels
 - 172 mg/dl to 142 mg/dl
- Insulin and Hyperglycemia Protocols have been approved as the “standard” for all cardiac surgery patients at FH