PERIOPERATIVE CRITICAL CARE: THE TOP TEN THINGS THAT MAKE A DIFFERENCE

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WVU Trauma Conference

Update May 2009

December 2008

CPR and Perioperative Critical Care 2008 - 2009

- Top Ten Targets
- Review of CPR
- Review of Critical Care:
  - Top 10 Things That Make a Difference

CPR UPDATE

Right from the horses …

listen while you wait!

Is Critical Care and CPR a Reinvention of the Wheel?

What are we trying to accomplish?

Are we making any progress?

What is old?

What is new?

What works?

What does not work?

Where should we put our energy?

Perioperative Critical Care

The Mission: Optimal Care and Outcome for all perioperative patients.

Objectives:

1. Minimize Perioperative Risk
2. Minimize Adverse Consequences of Intraoperative Events
3. Protect, Restore and Preserve Optimal (End Organ) Function through ABC & More
4. Prevent Intraoperative & Postoperative Injury
5. Other

Prevention of Perioperative Disasters

- Goal: Optimal Perioperative Outcome
  - Patient Selection
    - Who should have surgery?
    - Does the Risk of Surgery Outweigh the Potential Benefit?
    - Does the Risk of Anesthesia Outweigh the Risk of Surgery?
    - When should Surgery be done?
    - Emergency vs. Elective?
    - Is the patient Optimized?

Cardiorespiratory Arrest: Prevention

- Early Diagnosis and Definitive Treatment of Underlying Conditions
  - Respiratory Distress and Failure: (Including “Non Invasive Therapies”)
  - Coronary Artery Disease & Congestive Heart Failure
  - Valvular, Congenital & Other Acquired Heart Disease
  - Sepsis, Shock, Trauma
  - COPD and other chronic lung diseases
  - Stroke: Embolic, Hemorrhagic, SAH
  - Malnutrition and General Debility
  - Other (nonsurgical) Coexisting Conditions
  - Genetic and Familial Disorders

End of Life Issues

- Weather or not to start, when to continue and when to stop CPR & Critical Care; those are the questions.
- When in doubt continue aggressive care till you are certain about the direction to take based upon the patient's clinical condition and your best estimate of the patient's wishes.
- What does the patient want?
- Are we ever absolutely certain?
- What is Futility?

Patient Choices vs. Family Choices

“Compassion without knowledge is dangerous.”

- When in doubt, err on the side of life.
- When you are unaware of the facts, bow out of the process.
- “When you put only bad choices on the menu, patients and families always make the wrong decision.”
- Physicians are the agent of the critically ill patient. The patient is in your charge. When patients can’t make choices for themselves, your obligation is to make the best possible choices for the patient in consultation with the family.
- Think in terms of what you would want done in the same situation for yourself/someone you love … unless you have specific and **written** advanced directives **from the patient.**
- **Don’t impose personal beliefs; use the facts/expected outcome.**
- **The challenge: Objective decisions based upon facts, evidence and response to early aggressive treatment.**

Hippocratic Oath

I SWEAR BY APOLLO, the Physician, and Aesculapius and Health and All-Heal and All the Gods and Godesses that, according to my ability and judgement, I will keep this Oath and Stipulation:

TO RECKON him who taught me this art equally dear to me as my parents. to share my substance with him and relieve his necessities if required: to regard his offspring as on the same footing with my own brothers, and to teach them this art if they should wish to learn it without fee or stipulation, and that by precept lecture and every other mode of instruction. I will impart a knowledge of the art to my own sons and to those of my teachers, and to disciples bound by a stipulation and oath, according to the law of medicine, but to none others.

I WILL FOLLOW that method of treatment which, according to my ability and judgement, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to anyone if asked, nor suggest any such counsel; Furthermore, I will not give to a woman an instrument to produce abortion.

WITH PURITY AND WITH HOLINESS I will pass my life and practice my art. I will not cut a person who is suffering with a stone, but will leave this to be done by practitioners of this work. Into whatever houses I enter I will go into them for the benefit of the sick and will abstain from every voluntary act of mischief and corruption, and further from the seduction of females or males, bond or free.

WHATEVER, in connection with my professional practice, or not in connection with it, I may see or hear in the lives of men which ought not to be spoken abroad I will not divulge, as reckoning that all such should be kept secret.

WHILE I CONTINUE to keep this oath unviolated may it be granted to me to enjoy life and the practice of the art, respected by all men at all times but should I trespass and violate this oath, may the reverse be my lot.

HIPPOCRATES
460-377 B.C.

Good Vs. Greed

- Problem: Greed is a fundamental animal function based upon survival instincts. Humans, being animals, are subject to the same instincts. While we have the capacity to override our instincts, when push comes to shove … when the chips are down, humans as a rule, will be selfish and cater to their own survival before the safety and security, or good of others. Yes, there are exceptions in human and other animal populations. For example, the parent who risks his or her life for the good of their child, or the teacher, soldier, pilot, etc. who, at considerable personal risk, takes care of their charge. Where do we fit in this picture?
- The Pilot Analogy? Does it work?

First a CPR Update

“New York City ambulances to divert cardiac arrest patients to hospitals equipped to use therapeutic hypothermia.”

On its front page, the New York Times (12/4, A1, Hartocollis) reports that, beginning "Jan. 1, New York City ambulances will take many cardiac arrest patients only to hospitals that use a delicate cooling therapy believed to reduce the chances of brain damage and increase the chances of survival."

What's This About?

The move "indicates a shift away from the prevailing view among emergency workers and the public that how fast critically ill patients reach the hospital is more important than which hospital treats them." Some think, however, "that the policy could be unfair to" smaller hospitals that don't offer the treatment because of financial or staffing reasons. But, David J. Prezant, M.D., chief medical officer of the New York Fire Department, "argued that scientific data show the survival rate of cardiac arrest patients treated with therapeutic hypothermia...is so much better than with conventional treatment that it would be irresponsible not to provide it." Notably, "New York joins a handful of other American cities, including Seattle, Boston, and Miami, as well as Vienna and London, in requiring transport to hospitals with cooling systems."

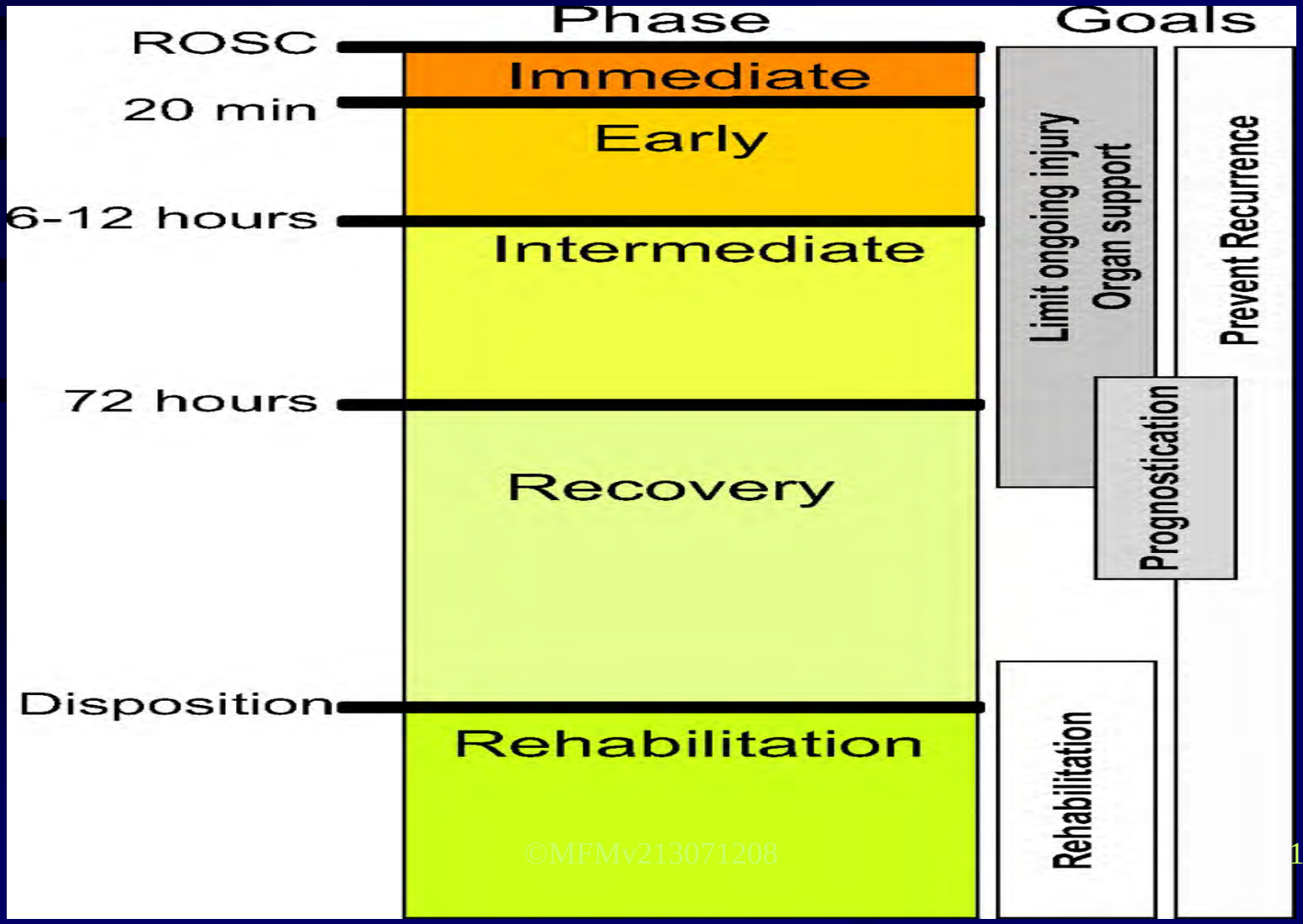
CPR Outcome

- The first large multicenter report on patients treated for cardiac arrest was published in 1953.[4] The in-hospital mortality rate for the 672 adults and children whose "heart beat was restarted" was 50%. More than a half-century later, the location, cause, and treatment of cardiac arrest have changed dramatically, but the overall prognosis after ROSC has not improved. The largest modern report of cardiac arrest epidemiology was published by the National Registry of Cardiopulmonary Resuscitation (NRCPR) in 2006.[5] Among the 19 819 adults and 524 children who regained any spontaneous circulation, in-hospital mortality rates were 67% and 55%, respectively. In a recent study of 24 132 patients in the United Kingdom who were admitted to critical care units after cardiac arrest, the in-hospital mortality rate was 71%.[6]

“Post Cardiac Arrest Syndrome”

- **Resumption of spontaneous circulation (ROSC)** after prolonged, complete, whole-body ischemia is an unnatural pathophysiological state created by successful cardiopulmonary resuscitation (CPR). In the early 1970s, Dr Vladimir Negovsky recognized that the pathology caused by complete whole-body ischemia and reperfusion was unique in that it had a clearly definable cause, time course, and constellation of pathological processes.[1–3] **Negovsky named this state "postresuscitation disease."** Although appropriate at the time, the term "resuscitation" is now used more broadly to include treatment of various shock states in which circulation has not ceased. Moreover, the term "postresuscitation" implies that the act of resuscitation has ended. **Negovsky himself stated that a second, more complex phase of resuscitation begins when patients regain spontaneous circulation after cardiac arrest.[1] For these reasons, we propose a new term: "post–cardiac arrest syndrome."**

Phases of Post Cardiac Arrest Syndrome



Cardio Pulmonary Resuscitation 2008 in a Nutshell

- What's New?
- Is Anything New?
- Can We Predict Who Will Recover and Who Will Not?
- To Code or Not to Code; That is Still the Question? (Who Should Get CPR?)
- How Should it be Done?

CPR Breaking News

- Don’t Start CPR on Terminally Ill Patients
- When in Doubt Start Until You Are Certain
- Follow Patient’s Wishes
- When in Doubt Turn Up the JUICE and DO NOT INTERRUPT CPR FOR SHOCKS & Other Stuff
- Hypothermia Helps
- Outcome Still Bad
- What About Hyperbaric Oxygenation

Hyperbaric Oxygenation

- HANGING AND NEAR-HANGING: MORBIDITY, MORTALITY AND THE EFFECT OF HYPERBARIC OXYGEN THERAPY ON OUTCOME. A RETROSPECTIVE REVIEW OF THE MIEMSS EXPERIENCE. M.F. Mascia, R.A.M., Myers. Maryland Institute for Emergency Medical Services Systems (MIEMSS), 22 S. Greene St., Baltimore, MD 21201

Near Hanging and HBO Rx

- All patients with delay in treatment greater than 300 minutes died while 5 patients with admission GCS less than 6 who were treated within 300 minutes achieved discharge GCS of 15.
- Conclusion: Near hanging (non judicial) produces a constellation of pathology that depends upon methods and duration. Hyperbaric oxygen therapy appears to have a beneficial effect upon the outcome of survivors. A comprehensive database and multicenter trial will be necessary to establish optimal hyperbaric oxygen treatment for near hanging victims.

CPR and Perioperative Critical Care

Top Ten Targets

- Overall Goal: Preservation of Individual and Family Integrity
- Restoration and/or Preservation of End Organ Function

1. Elegant Brain, BRAIN & CNS
2. Heart
3. Lung
4. Kidney
5. Liver

6.Gut 7. Skin 8. Endocrine 9. Immune 10. Other

What is Elegant Brain Function?

- Those Functions that distinguish Humans from other animals
- Such as the ability to?
  - create works of art, music, etc
  - ? anticipate
  - ? be productive,
  - ? build systems, etc

MAKE A DIFFERENCE

Preventing Perioperative Disasters
Focus on Problems Discovered
During Preoperative Evaluation

Michael F. Mascia, MD, MPH

Tulane OB-GYN Grand Rounds

September 19, 2002

WVUH Trauma Conference

Update May 14, 2009

PERIOPERATIVE CRITICAL CARE:

TOPICS FOR DISCUSSION:

- Definitions
- History of Critical Care
- Preoperative Overview: Emergency vs. Elective
- General Health Evaluation
- Preoperative tune-up: avoiding delays, cancellations and disasters (Optimizing Perioperative Outcome)
- Airway: Dental care, difficult intubation
- Breathing: Asthma, COPD
- Circulation: ASHD, CHF, Shock, Potential bleeding
- Drugs: Herbs, Street Drugs and Prescription Drugs
- Environment: Insecticide exposure, temperature
- Electrolytes and Fluids: preoperative maintenance
- Family: MH history
- General Health: Nutrition

DEFINITIONS:

CRITICAL CARE
DIFFERENCE
VALUE
IMPACT
OUTCOME
COST
CHARGE

DEFINITION: CRITICAL CARE

PRESERVATION AND RESTORATION OF LIFE AND VITAL FUNCTIONS IN PATIENTS AT RISK OF IMMEDIATE DEATH, ORGAN INJURY, OR LOSS OF LIMB

What does it mean?
TO MAKE A DIFFERENCE IN PERIOPERATIVE CRITCAL CARE

Think about VALUE

Think about IMPACT

Think about OUTCOME

Think about COST

DEFINITION:
DIFFERENCE
TO MAKE A DIFFERENCE
(Intuitively Obvious
vs.
Measured Difference)
5 : a significant change in or effect on a situation

ICU Intensivist Can Mean Difference Between Red and Black Ink

Society of Critical Care Medicine Present Concept at the 31st Critical Care Congress (San Diego, January 29, 2002)

ICU Intensivist:

The value of an intensivist and the intensivist-directed model of care delivery in the intensive care unit (ICU) can exceed 10 times the cost of his or her salary and benefits, according to Arthur H. Combs, MD, FCCP, FCCM.

ICU Intensivist:

"Hiring an intensivist offers a net present value (NPV) to the hospital in the tens of millions of dollars," says Dr. Combs

Net Present Value (NPV)?

The Beancounters' View

NPV is a basic economic analysis that allows comparison of the value of something NOW (i.e., its present value) with the value of something in the FUTURE.

DEFINITION:

VALUE (89 ENTRIES)

3 a : relative worth, utility, or importance **:** degree of excellence **:** status in a scale of preferences <we know the *value* of a thing by the way it is sought, shunned, protected -- H.N.Wieman>

DEFINITION: IMPACT

b : a concentrated force producing change **:** an especially forceful effect checking or forcing change **:** an impelling or compelling effect <the *impact* of modern science and technology upon society as a whole

DEFINITION: OUTCOME

1 a : something that comes out of or follows from an activity or process

DEFINITION:
COST

5 : an item of outlay incurred in the operation of a business enterprise (as for the purchase of raw materials, labor, services, supplies) including depreciation and amortization of capital assets

see ACTUAL COST

DEFINITIONS: CHARGE (≠ COST)

5**b :** the price demanded for a thing or service <a 10-cent admission *charge*> -- often used in plural <reverse the *charges* for a telephone call>

DEFINITION:

The Focus for this discussion is more traditional and based upon the literature that demonstrates the impact (mostly positive) of perioperative critical care practices.

HISTORY

BIBLICAL TIMES: KINGS REFERENCE TO MOUTH-TO-MOUTH RESPIRATION

VESALIUS 1514-1564: ARTIFICIAL RESPIRATION ON A SOW
VIA TRACHEOSTOMY (BLOWING THROUGH REED OR CANE)
RECOGNITION THAT VENTILATION PREVENTS CARDIAC ARREST

ROBERT HOOKE 1635-1703: PRESERVING ANIMALS ALIVE
BY BLOWING THROUGH THEIR LUNGS WITH BELLOWS

PRIESTLY 1733-1804: DISCOVERY OF OXYGEN

PAUL BERT 1833-1886: NUMEROUS EXPERIMENTS
ON THE EXTRACTION AND MEASUREMENT OF
BLOOD GASSES

JOHN SNOW 1813-1858: ON THE INHALATION
OF THE VAPOR OF ETHER

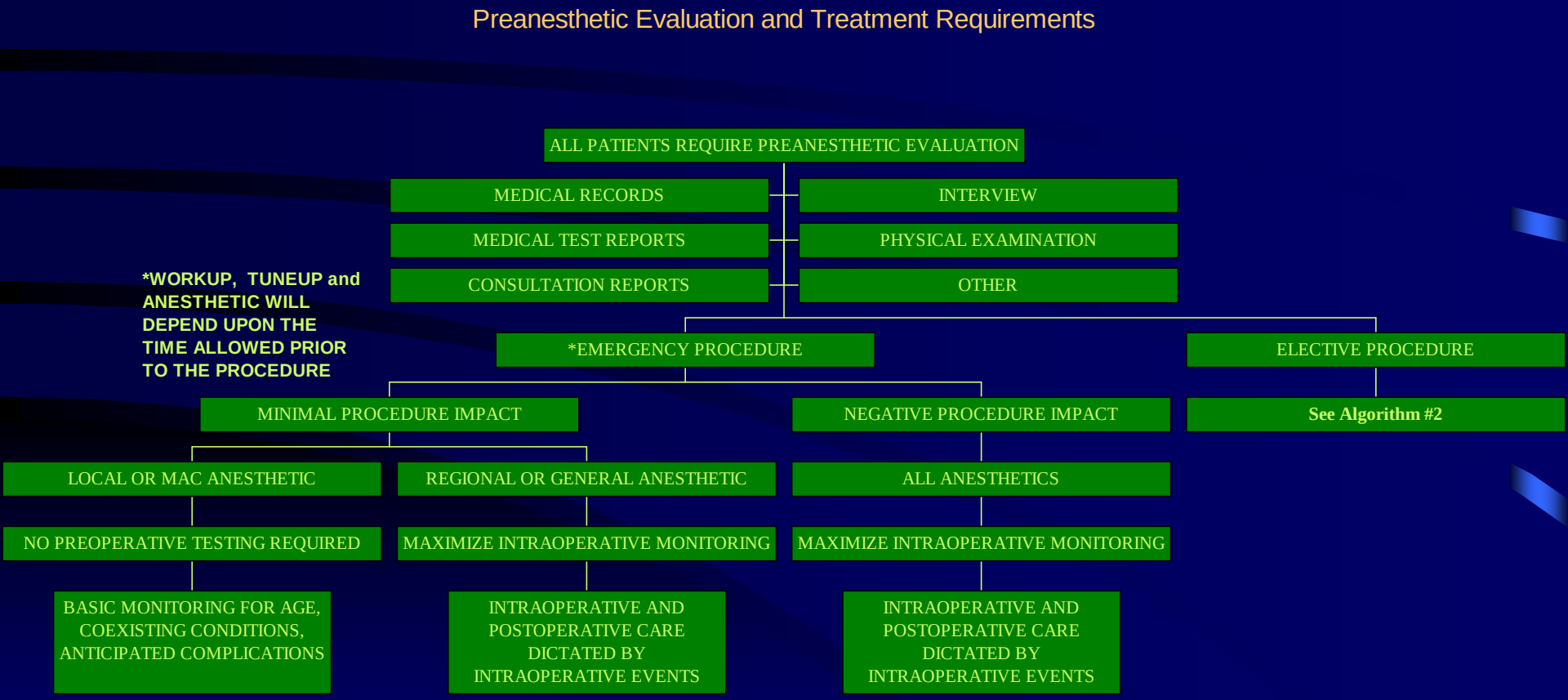
WHAT CAN YOU DO TO IMPROVE OUTOME IN HIGH RISK PATIENTS?

- Preoperative
- Intraoperative
- Postoperative

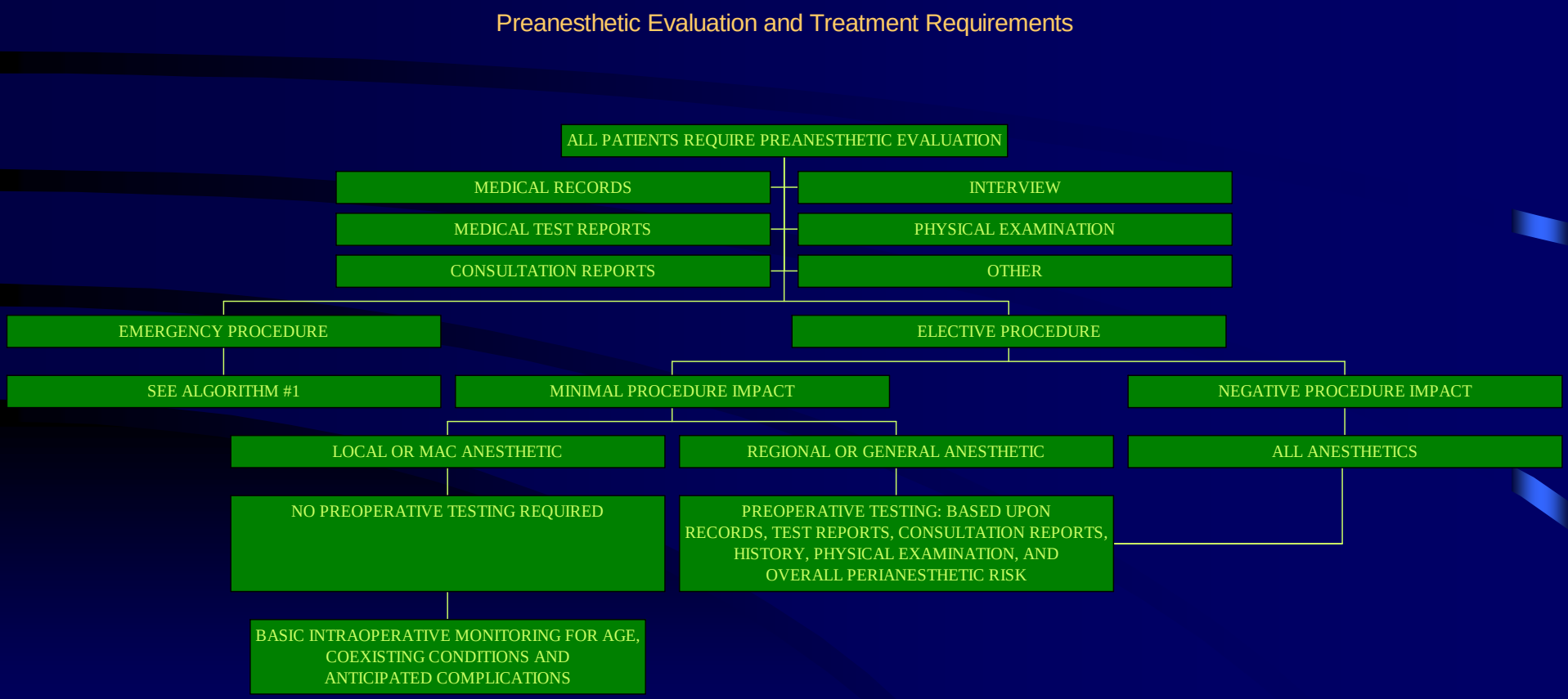
PERIOPERATIVE CRITICAL CARE:

Preoperative	Evaluation, Prophylaxis	Tune-Up, Therapy
Intraoperative	Monitoring Choices, Prophylaxis	Anesthetic Choices, Therapies
Postoperative	Monitoring Choices, Prophylaxis	Therapy

Preanesthetic Algorithm #1



Preanesthetic Algorithm #2



CASE # 1

40 Y/O LADY

SUDDEN ONSET ABDOMINAL PAIN, WEAKNESS, DIAPHORESIS

G=? 7 WKS, P=0

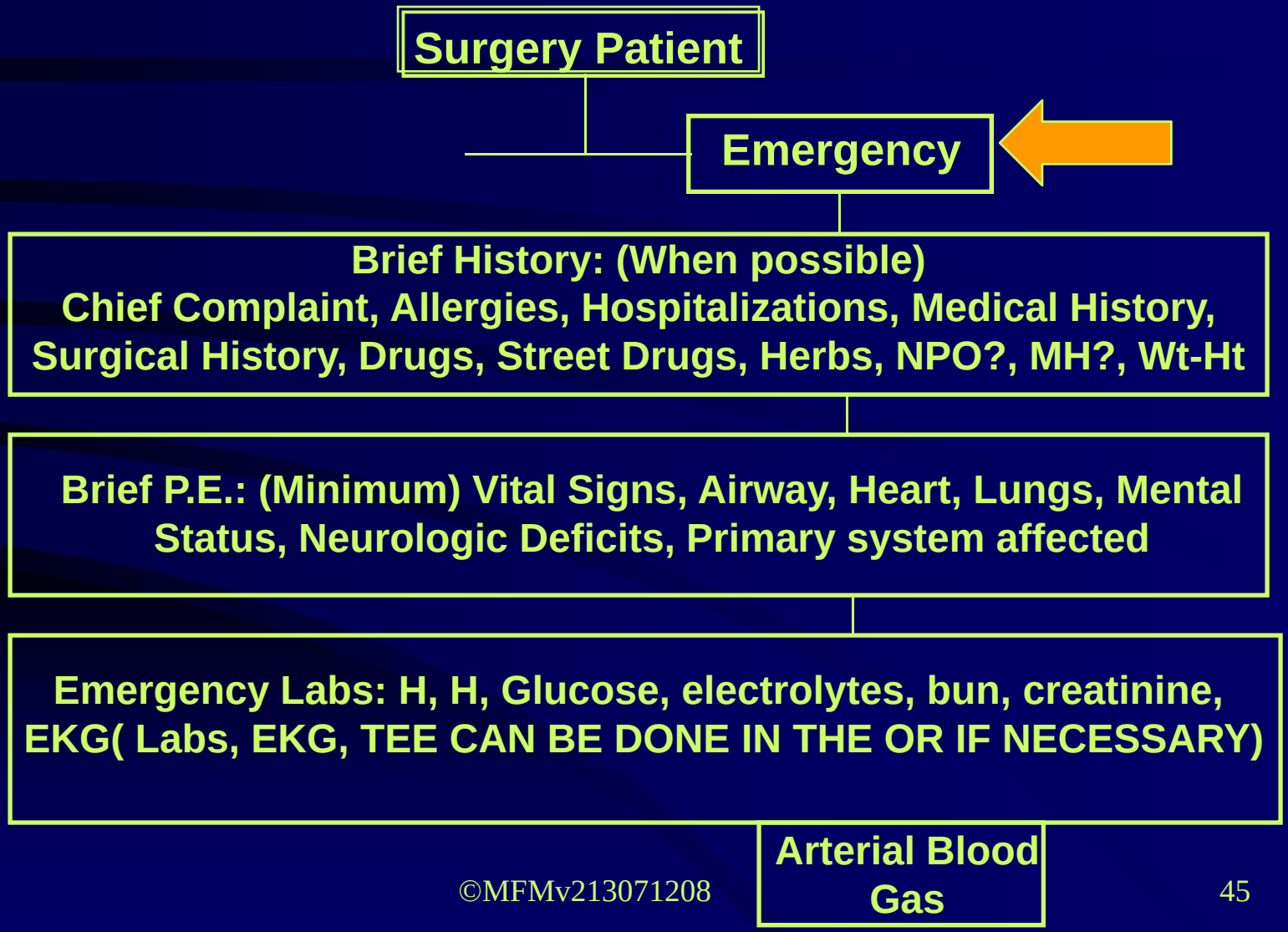
ARRIVES VIA ER WITHOUT IV

MENTAL STATUS =

+/- AROUSABLE

BP 70/40

Essentials of Preoperative Evaluation:



CASE # 1

- PRESUMPTIVE DIAGNOSIS:

  RUBTURED TUBAL PREGNANCY: Hemorrhagic Shock
- HISTORY AND PHYSICAL

  EVALUATION REQUIRED:

  MINIMAL
- TUNE UP REQUIRED: **>IV<, RESUSCITATE**, LABS, BLOOD

CASE # 1

EMERGENCY

EXPLORATORY LAPAROTOMY

30 SECOND EVALUATION AND TUNE UP

- HISTORY: ALLERGIES, MEDS, PRIOR SURGERY, MH
- EXAMINATION: MOUTH, TEETH, HEART, LUNGS
- LABS: H+H, TYPE AND X MATCH
- RESUSCITATION: 14-16g IV X 2, VOLUME
- ANESTH: RSI, AFTER RESUS IF POSSIBLE

Resuscitation FLUIDS

Simultaneous with evaluation

- Airway<> Breathing: Prompt definitive support as indicated, Intubation for Low GCS
- Circulation: Large bore peripheral IV x 2 (14-16g) Central line if necessary to get vein.
- **Fluid**: Colloid and blood? except in capillary leak syndrome

(Velanovich, Surgery, 1989)

INTRAOPERATIVE

CONTINUED RESUSCITATION AND EVALUATION, WITH SWIFT DEFINITIVE SURGICAL INTERVENTION.

- COLLOID, CRYSTALOID, BLOOD
- ARTERIAL BLOOD GASES
- LABS
- MONITORING

For the Obstetrician Gynecologists in the Audience

Perioperative Top Ten
Impact of OB ICU?

Maternal-Fetal Critical Care

- Maternal Deaths @ approximately
  22/100,000 Deliveries
- Causes: Hypertension, hemorrhage, infection
- Did not appear to be favorably influenced by development of OB ICU

Kirshon and co-workers, J Reprod. Med, 1990

Perioperative Impact?

Maternal-Fetal Critical Care

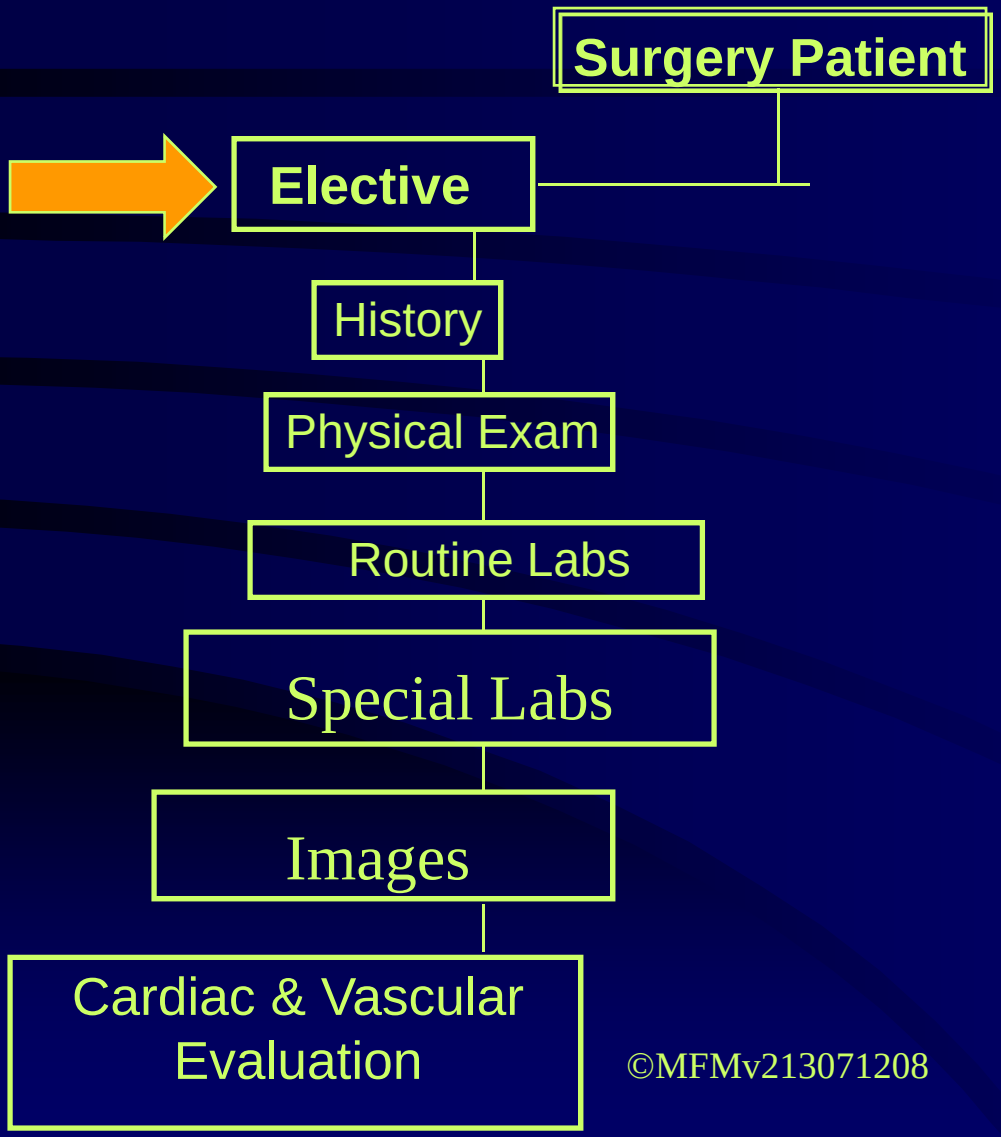
- 50% had preexisting medical conditions
- Maternal Mortality Rate 20%
- Fetal Mortality Rate 35%
- All maternal deaths were accompanied by Respiratory Failure and ARDS

Collop and Sahn, Chest, 1993

PERIOPERATIVE CRITICAL CARE:

Preoperative	Evaluation, Prophylaxis	Tune-Up, Therapy
Intraoperative	Monitoring Choices, Prophylaxis	Anesthetic Choices, Therapies
Postoperative	Monitoring Choices, Prophylaxis	Therapy

Essentials of Preoperative Evaluation:



WHAT ARE WE LOOKING FOR ON THE PREOPERATIVE EVALUATION?

- MALNUTRITION, ANEMIA
- DIABETES, THYROID DISEASE, PHEO
- HEART DISEASE: ANGINA, CHF, CONGENITAL
- HYPERTENSION:
- PULMONARY DISEASE:
- CEREBROVASCULAR DISEASE (BRAIN PROTECTION)
- RENAL FAILURE AND RENAL PROTECTION
- MALIGNANT HYPERTHERMIA
- AIRWAY AND DENTAL ABNORMALITIES

WHAT TO DO?

MALNUTRITION

PATIENTS WITH **PREOPERATIVE MALNUTRITION**

- BENEFIT FROM PERIOPERATIVE TOTAL PARENTERAL NUTRITION

  VA STUDY GROUP,NEW ENGLAND JOURNAL, 1991

  DETSKY, et al, Ann Internal Med, 1987

WHAT TO DO?

ANEMIA

PATIENTS WITH **PERIOPERATIVE ANEMIA** AND **ASHD**

- BENEFIT FROM TRANSFUSION TO MAINTAIN A HEMATOCRIT AROUND 30%

WHAT TO DO?
CHF

PATIENTS WITH

PREOPERATIVE CHF

- BENEFIT FROM PREOPERATIVE TUNE UP, OPTIMIZATION AND INTENSIVE MONITORING THAT INCLUDES THE USE OF SWAN GANZ CATHETER INTRAOPERATIVELY AND POSTOPERATIVELY

WHAT TO DO?
ASHD

PATIENTS WITH

PREOPERATIVE ASHD

- High Risk or Clinical Evidence Suggestive of ASHD?
- Stress Echocardiogram and Cardiac Cath. May be followed by revascularization, or medical rx depending upon the findings.

WHAT TO DO?
ASHD

PATIENTS WITH

PREOPERATIVE ASHD

- BENEFIT FROM PREOPERATIVE TUNE UP, OPTIMIZATION AND BETA BLOCKERS.
- SEVERE ASHD PATIENTS MAY NEED REVASCULARIZATION **BEFORE** ELECTIVE SURGERY FOR THE PRIMARY PROBLEM.
- HIGH RISK PATIENTS WILL BENEFIT FROM PERIOPERATIVE BETA BLOCKERS, CLOSE MONITORING, AND TIGHT PAIN CONTROL

WHAT TO DO?
ASTHMA

PATIENTS WITH

PREOPERATIVE ASTHMA will benefit from optimization

WHAT ARE WE LOOKING FOR ON THE PREOPERATIVE EVALUATION?

- WHAT TO DO WHEN YOU FIND IT

Perioperative Impact: Top Ten PROBLEMS

- Preoperative
  - Nutrition
  - Glucose Control
  - CHF Optimization
  - ASHD Optimization and Beta Blockers

ICU Intensivist VS Obstetrician-Gynecologist:

THIS IS NOT AN INFOMERCIAL FOR THE SCCM AND Critical Care PHYSICIANS OF THE WORLD. THESE ARE SOME SUGGESTIONS THAT MAY MAKE A DIFFERENCE IN THE PERIOPERATIVE CARE OF YOUR CRITICALLY ILL PATIENTS.

Perioperative Critical Care for the Surgeon/Obstetrician-Gynecologist

FOCUS:

- **ADULT PATIENTS**
- **ELECTIVE SURGERY**
- **PREOPERATIVE EVALUATION AND**
- **TUNE-UP**
- **AVOIDANCE OF INTRAOPERATIVE DISASTERS**
- **OBSTETRIC DISASTERS**

- **OPTIMAL POSTOPERATIVE CARE OF THE HIGH RISK PATIENT**

Perioperative Critical Care for the Surgeon/Obstetrician-Gynecologist

FOCUS:

CRITICAL CARE IS ALL ABOUT

ANTICIPATION

PREVENTION

SUPPORT

AND

RAPID DEFINITIVE INTERVENTION

John Snow

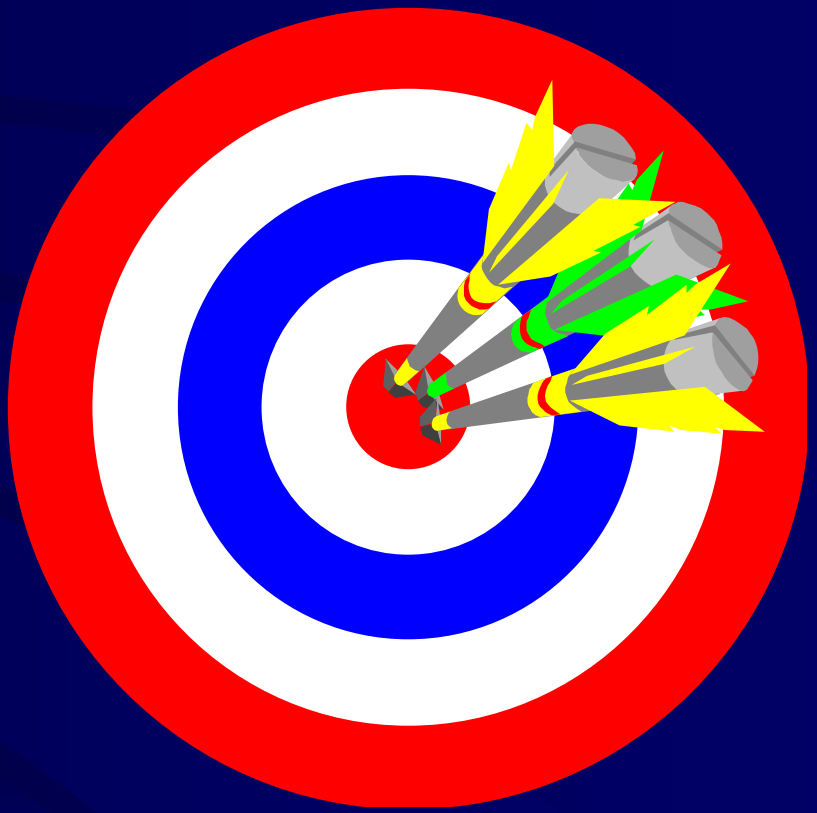
Who is John Snow?

John Snow

In 1847
Published
on the
Inhalation
of the
Vapour of Ether
in
Surgical Operations

John Snow

1847
containing a
Description
of the
Various
Stages
of
Etherization



John Snow

1847
and a
Statement of the
Results
of
Nearly Eighty
Operations

John Snow
1847

- Recognized the VALUE of Ether

"From questions addressed to me by medical visitors and students, after the operations in the two hospitals in which I have had the honour of administering the ether, I judged that a fuller account than I had hitherto given of the process might be useful, and not unacceptable to many members of the profession"

John Snow
1847

- Learned of the American Experience with ether in 1846
- Studied the Drug
- Developed a vaporizer
- Gave it to patients
- Studied the effects
- Reported the results

John Snow
1847

- Low tech
- No Discussion of cost
- No financial support

John Snow 1858

On Chloroform
and other
Anaesthetics

Consider the VALUE of John Snow

To the

Patients he served, the

Medical Profession, and the

Patients served since his time

New York Times
Tuesday, July 13, 1999

Are Doctors Losing Touch With Hands-On Medicine?

So What?

What difference does it make?

And … with that question I leave you … in deep thought … till next time.