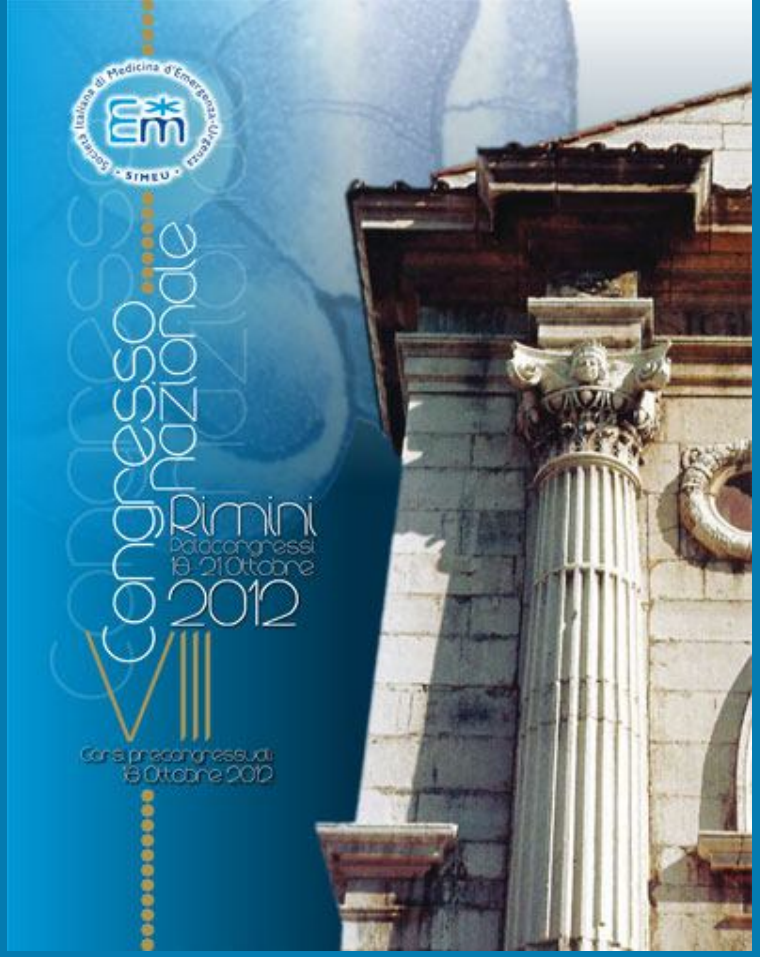


Insufficienza Renale Acuta: Proviamo a evitarla

Fernando Schiraldi
Medicina d'Urgenza-PS-OM Ospedale San Paolo-Napoli

schirald@gmail.com

ACUTE RENAL FAILURE

- 15-30% of medical ICU pts
- 67% In-Hosp “acquired”
- 4-10 times increase the OR of DEATH
- Mostly preventable

S.Uchino-R.Bellomo CCM 2006

An Official ATS/ERS/ESICM/SCCM/SRLF Statement: Prevention and Management of Acute Renal Failure in the ICU Patient

An International Consensus Conference in Intensive Care Medicine

Laurent Brochard, Fekri Abroug, Matthew Brenner, Alain F. Broccard, Robert L. Danner, Miquel Ferrer, Franco Laghi, Sheldon Magder, Laurent Papazian, Paolo Pelosi, and Kees H. Polderman, on behalf of the ATS/ERS/ESICM/SCCM/SRLF Ad Hoc Committee on Acute Renal Failure

AKI in ICU
(30%)

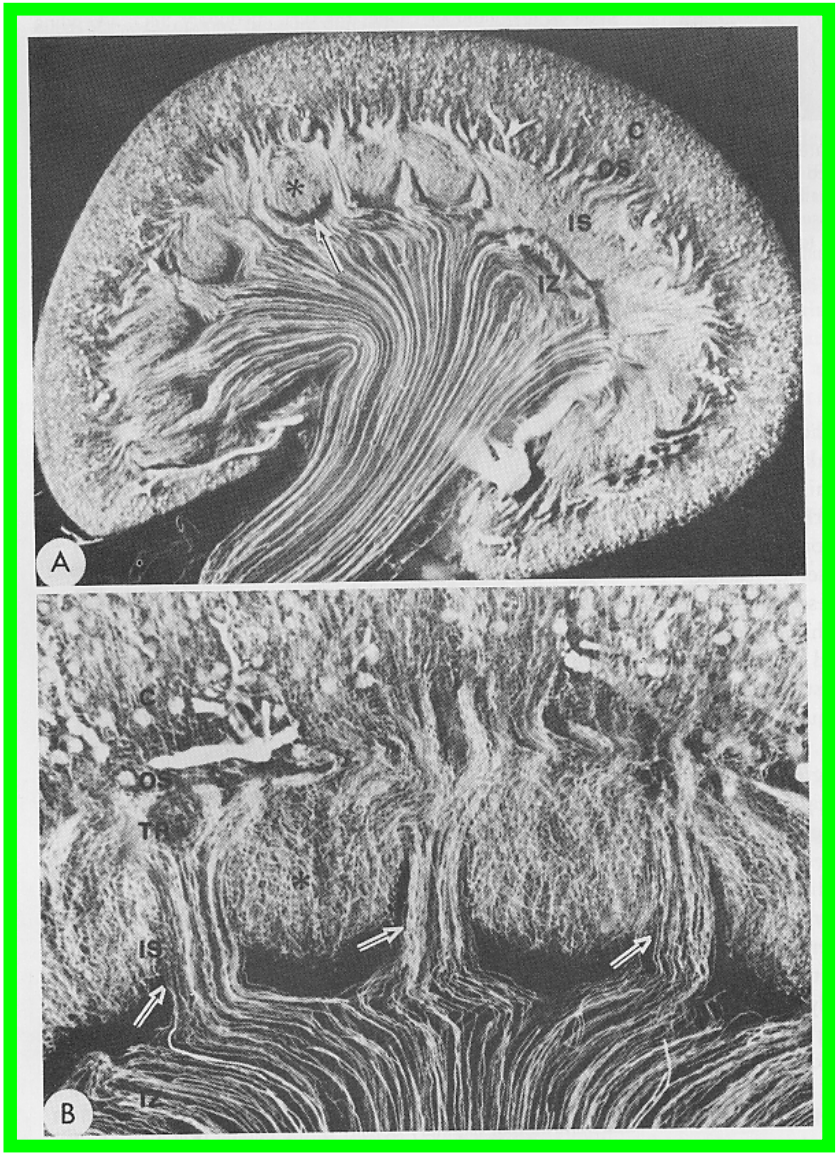
- ⬆ MOF
- ⬆ LOS
- ⬆ in-Hosp mortality

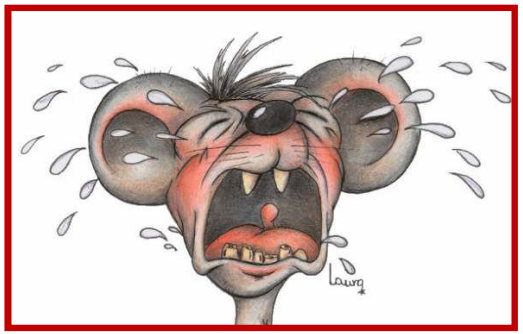
Am J Respir Crit Care Med2010;181:1128–1155

Renal main functions & how it works

- *Cohoperate in perfusion**
- *Waste products*
- *Acid-base*
- *Electrolytes*
- *Osmolality*
- *Erytropoietin*
- *……..*

The Psammomys smart kidney





....*and the dehydrated or hypoperfused patient*

Renal main functions & How it works

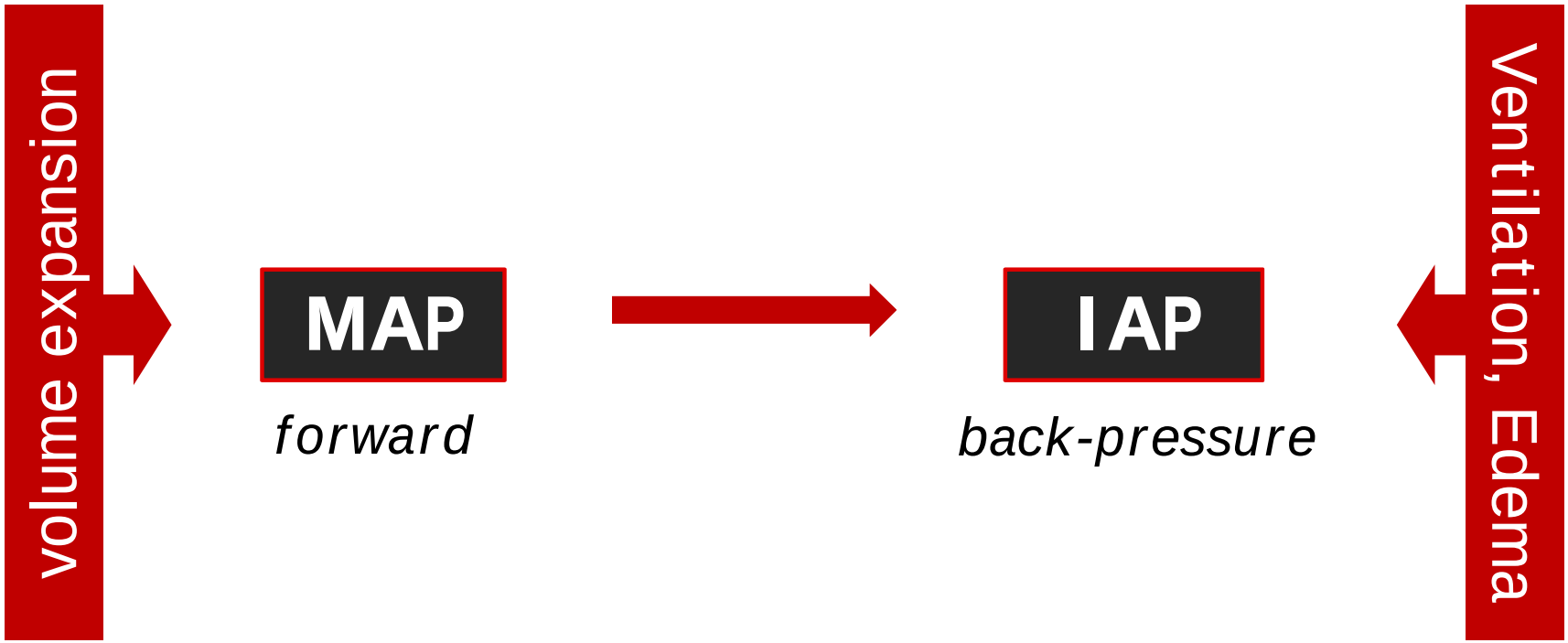
- *Cohoperate in perfusion/hydration**
- ……if LOW……

….Need for compensation results in renal vasoconstriction, oliguria, metabolic alkalosis and waste products retention….

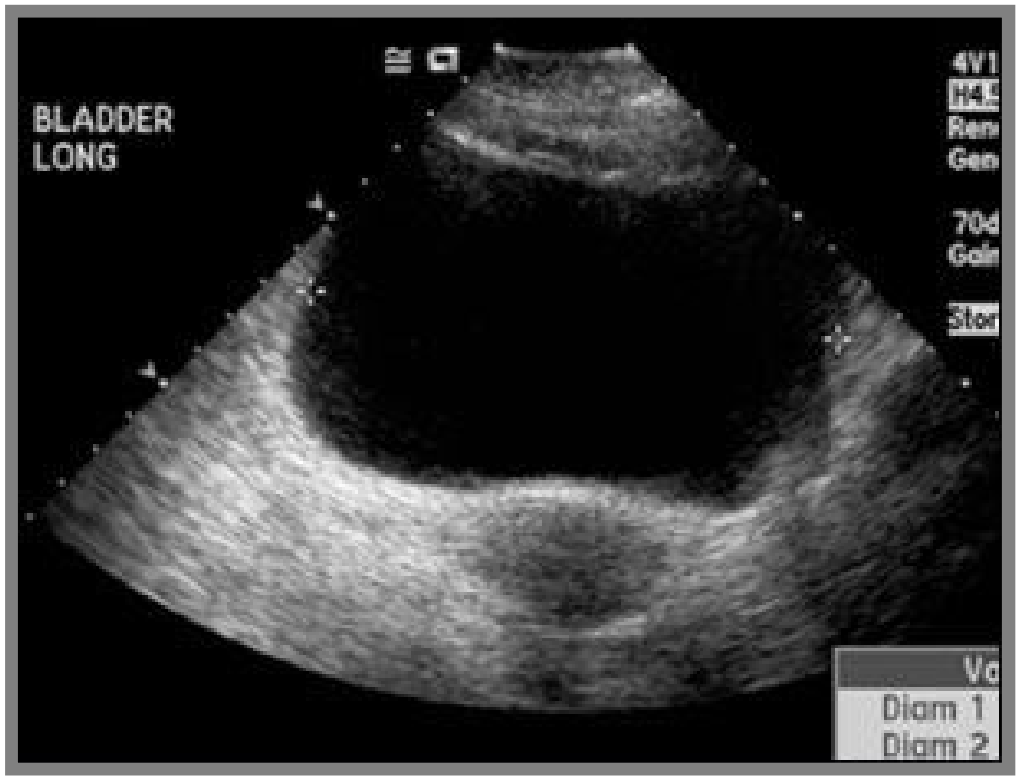
…….this is a SUCCESS!! (Time-limited)

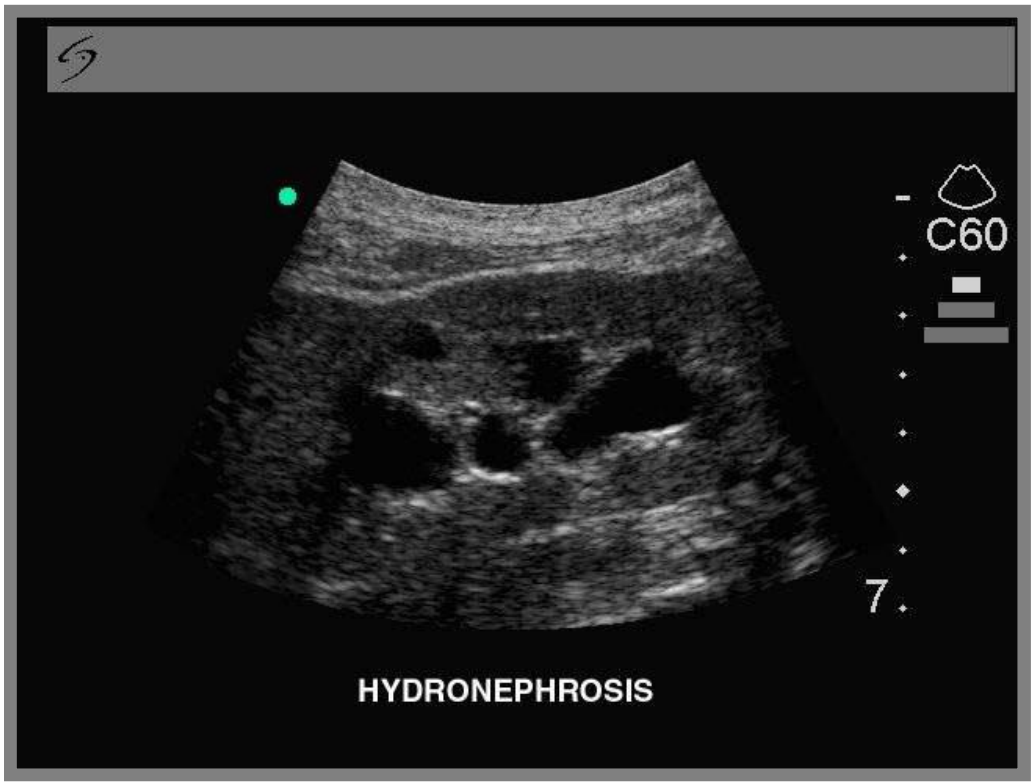
M.Palazzo APICE Proc. 2006

THE RENAL PERFUSION PRESSURE



1. Rule-out Obstruction





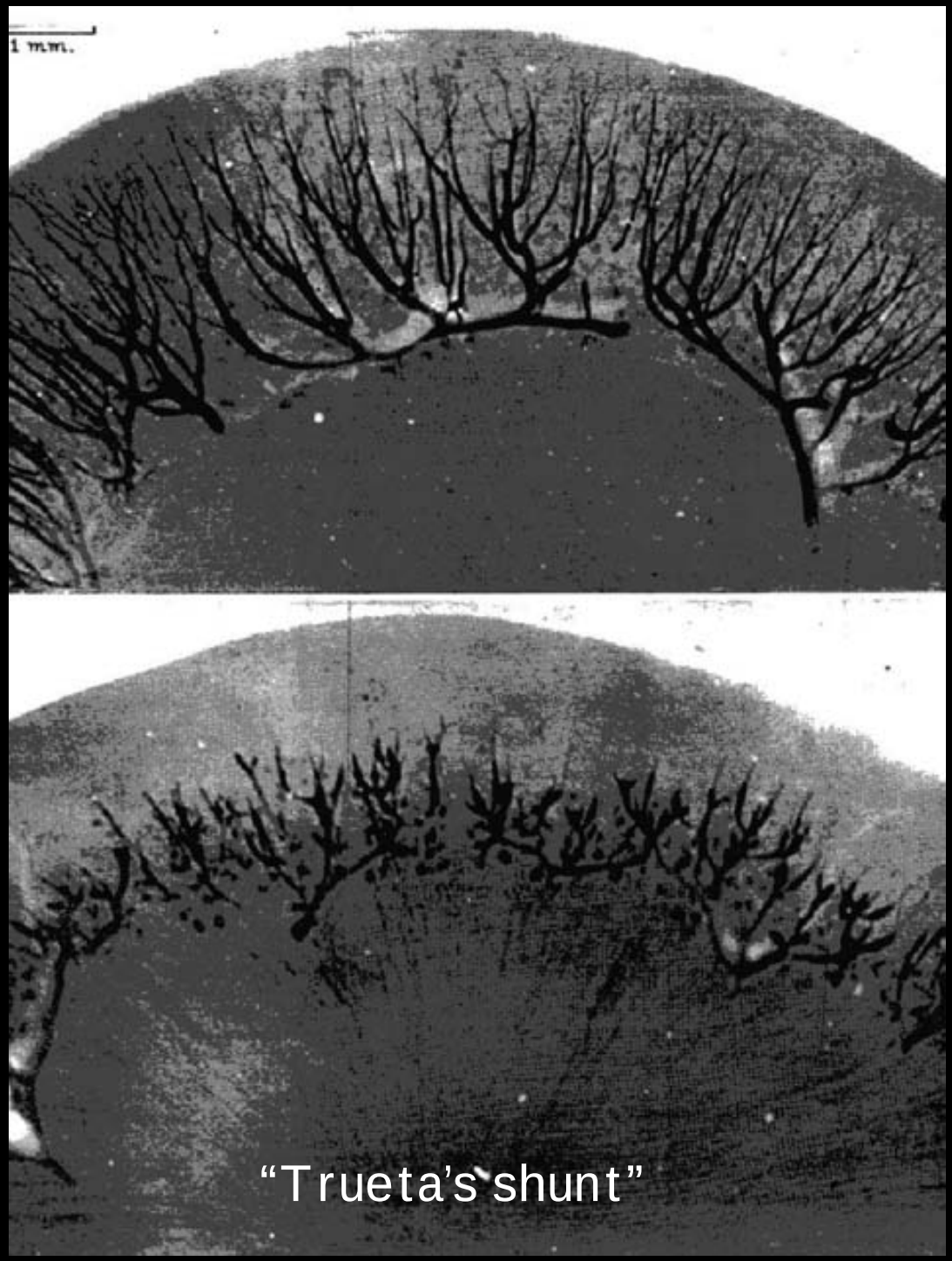
2. Treat Pre-Renal… ASAP

Prerenal failure: a deleterious shift from renal compensation to decompensation

KF Badr, and I Ichikawa

NEJM 1988; 319:623-629

- **Pre-pre-renal**
- **Pre-renal**
- **Renal**



"Trueta's shunt"

STUDIES OF THE RENAL CIRCULATION

By

JOSEP TRUETA
M.D., HON. D.SC. (OXON.), HON. F.R.C.S. (CANADA)

ALFRED E. BARCLAY
O.B.E., D.M., HON. D.SC. (OXON.), F.R.C.P., F.F.R., F.A.C.R.

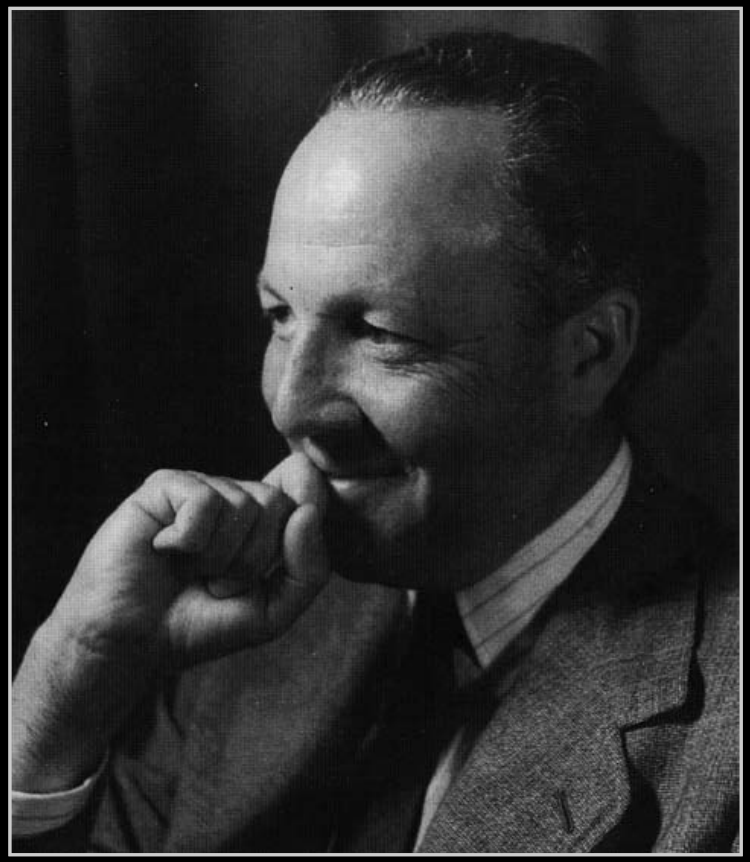
PETER M. DANIEL
M.A., M.B.

KENNETH J. FRANKLIN
D.M., F.R.C.P.

MARJORIE M. L. PRICHARD
M.A.

From

The Nuffield Institute for Medical Research
Oxford



My patient is oliguric ….

Fullness

CO

MAP

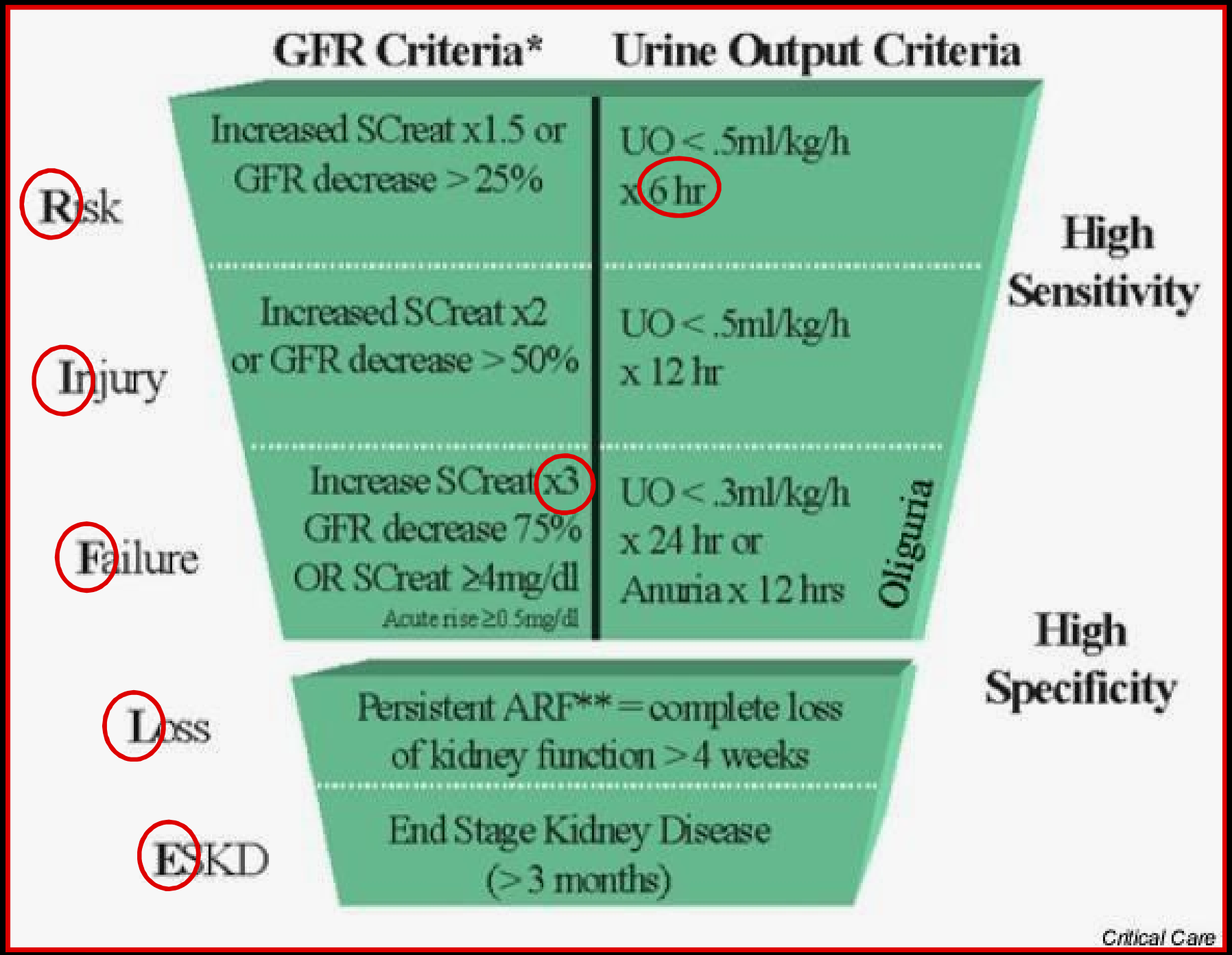
Drugs

US

Let's give a look to the urine !

Hemodynamic vs ATN

π	High	Low
Na	Low	High
FE_{Na}	<1%	>2%
UREA/CREAT	> 40	<40
CASTS	- -	++



Bellomo R et Al. (ADQI workgroup) Crit Care 2004

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RIFLE vs **AKIN**

$UO > [Creat]_p$

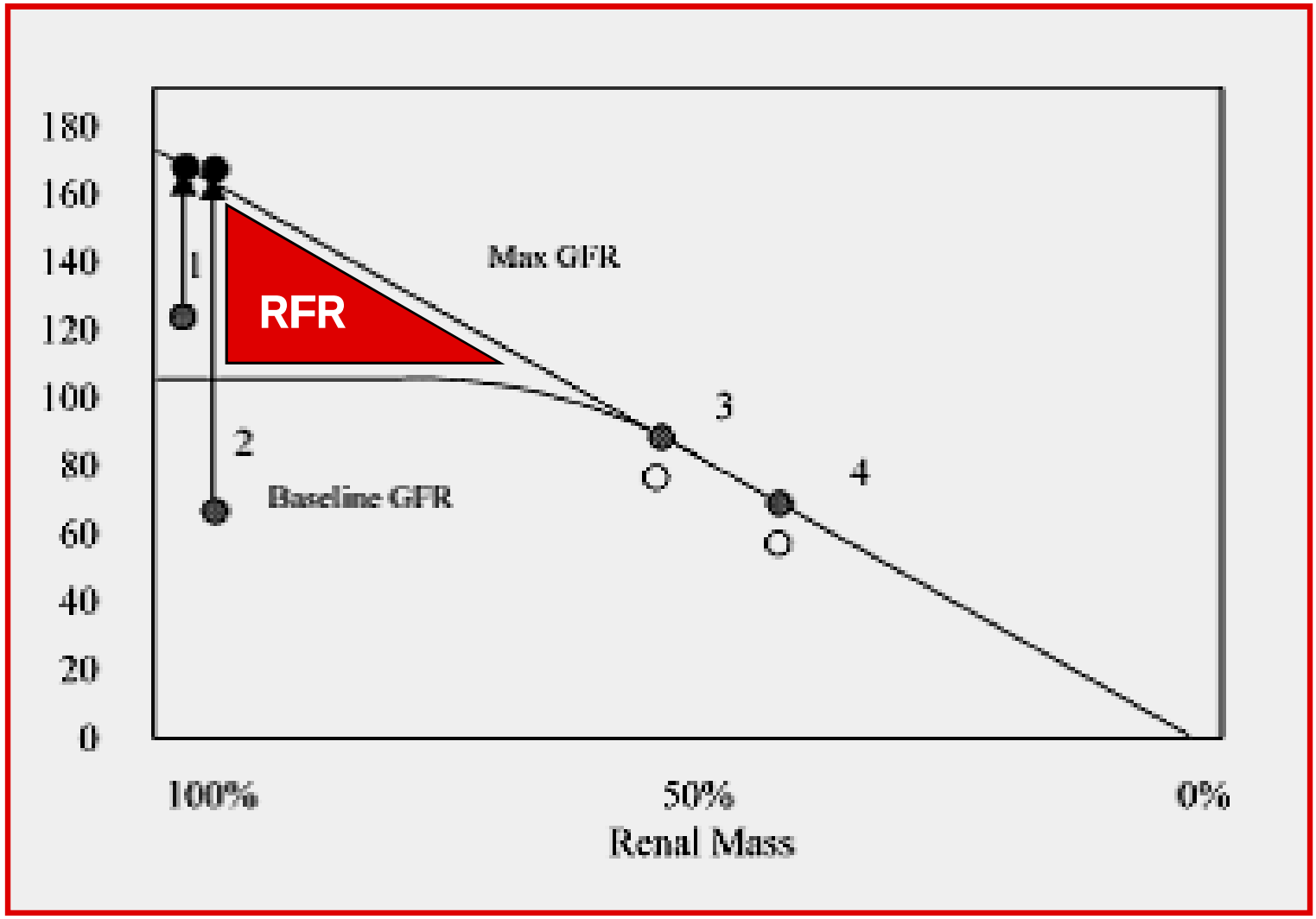
$UO < [Creat]_p$

Am J Respir Crit Care Med2010;181:1128–1155

THE “ FALSE “ CREATININEMIAS

EGFR = [(140-age) x kg x [0.85]) / (Cr (mmol/L)]

The renal "functional reserve"



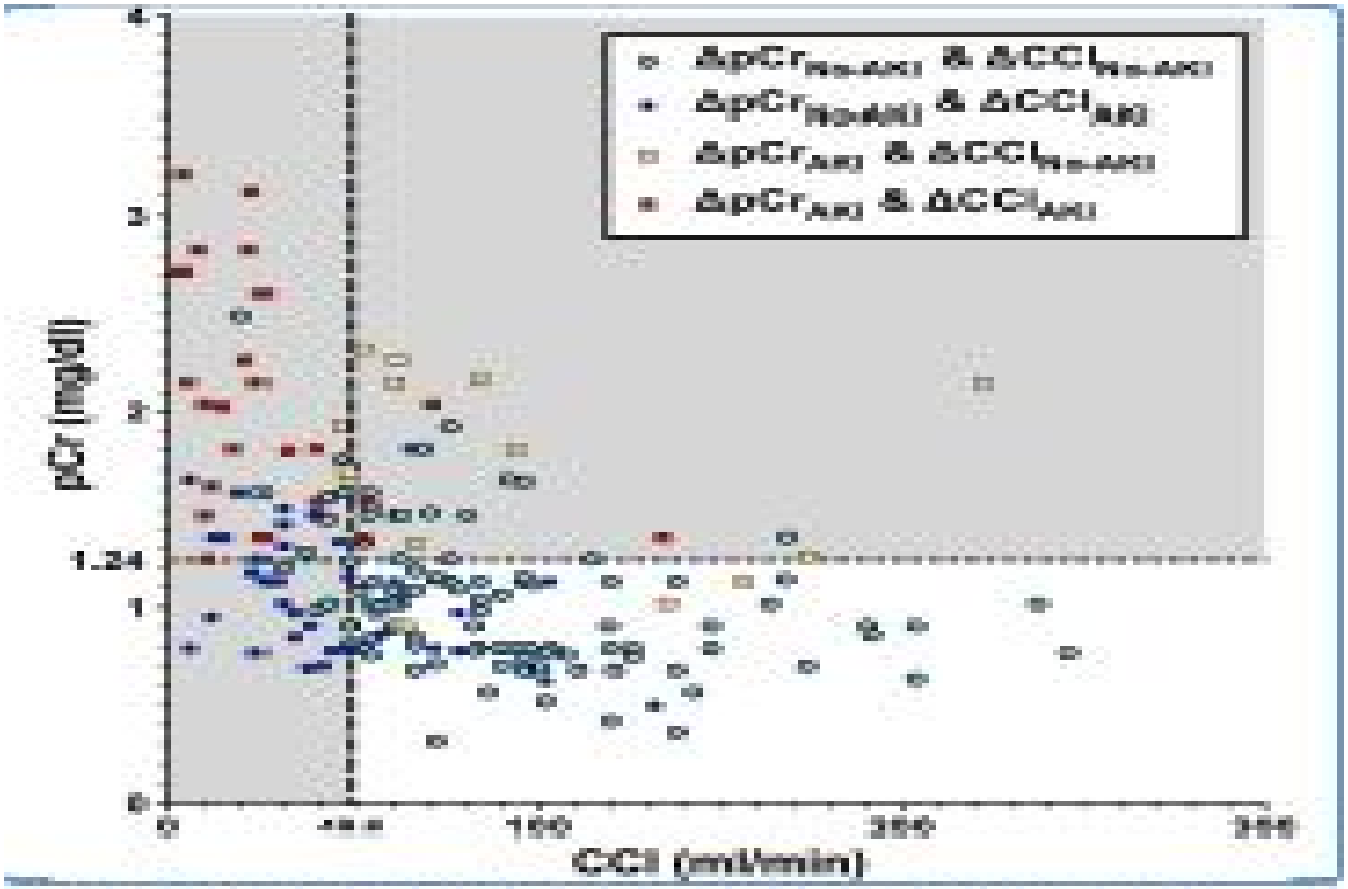
Pickering et al. Critical Care 2012, 16:R107
http://ccforum.com/content/16/3/R107

FAST C Cl ?

CRITICAL CARE

RESEARCH Open Access

Four hour creatinine clearance is better than plasma creatinine for monitoring renal function in critically ill patients



Four hour creatinine clearance is better than plasma creatinine for monitoring renal function in critically ill patients

Pickering et al.

"INTERMEDIATE SYNDROME":

A TYPICAL PATTERN OF PRE-RENAL ACUTE RENAL FAILURE IN THE ELDERLY

and, did you know ?...

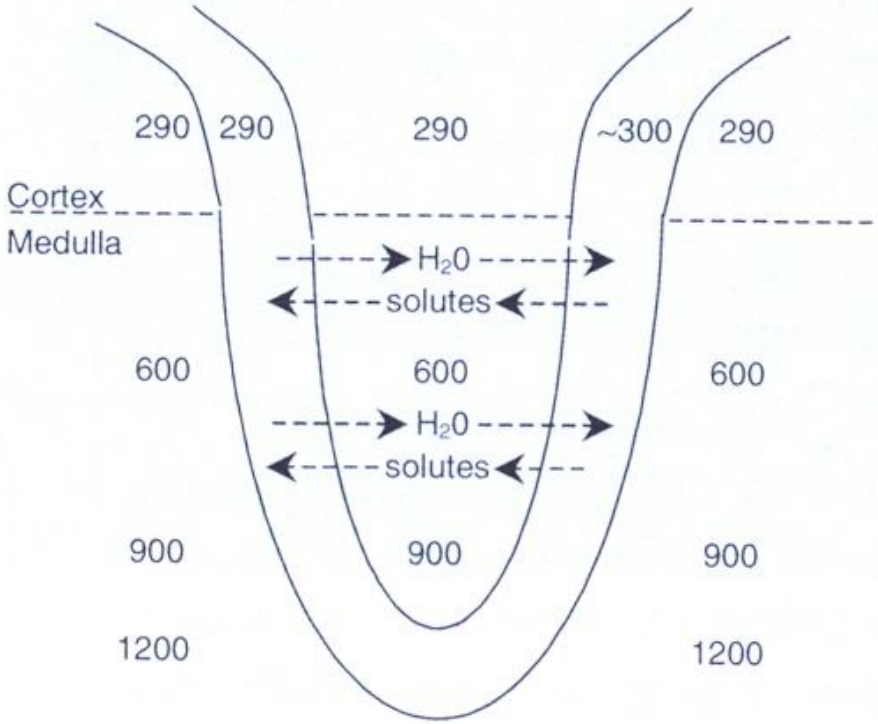
..if hypotensive and low π...

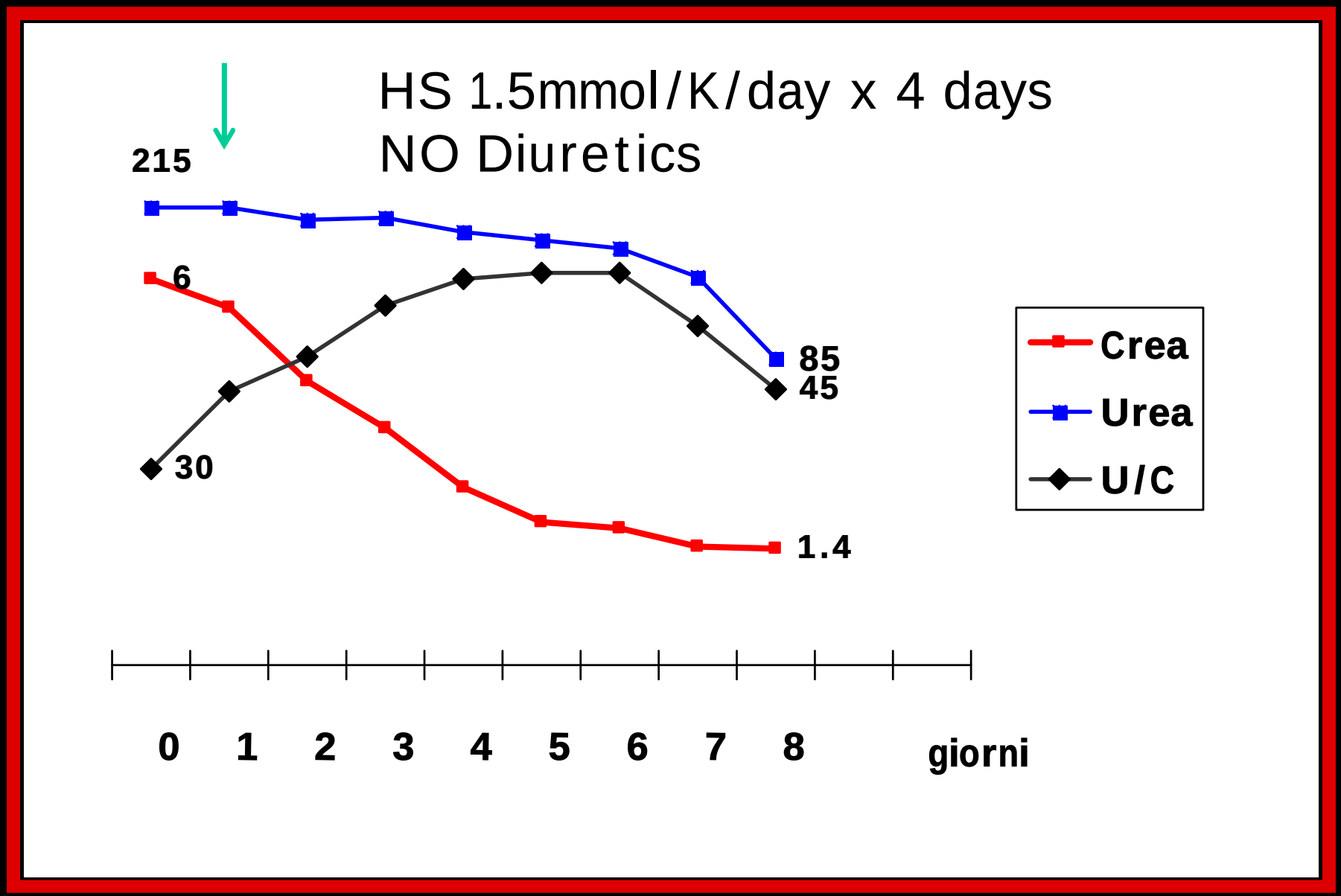
...you could give HS to improve

- **RBF**
- **CC Machinery**

Figure 4. Countercurrent exchange in the vasa recta

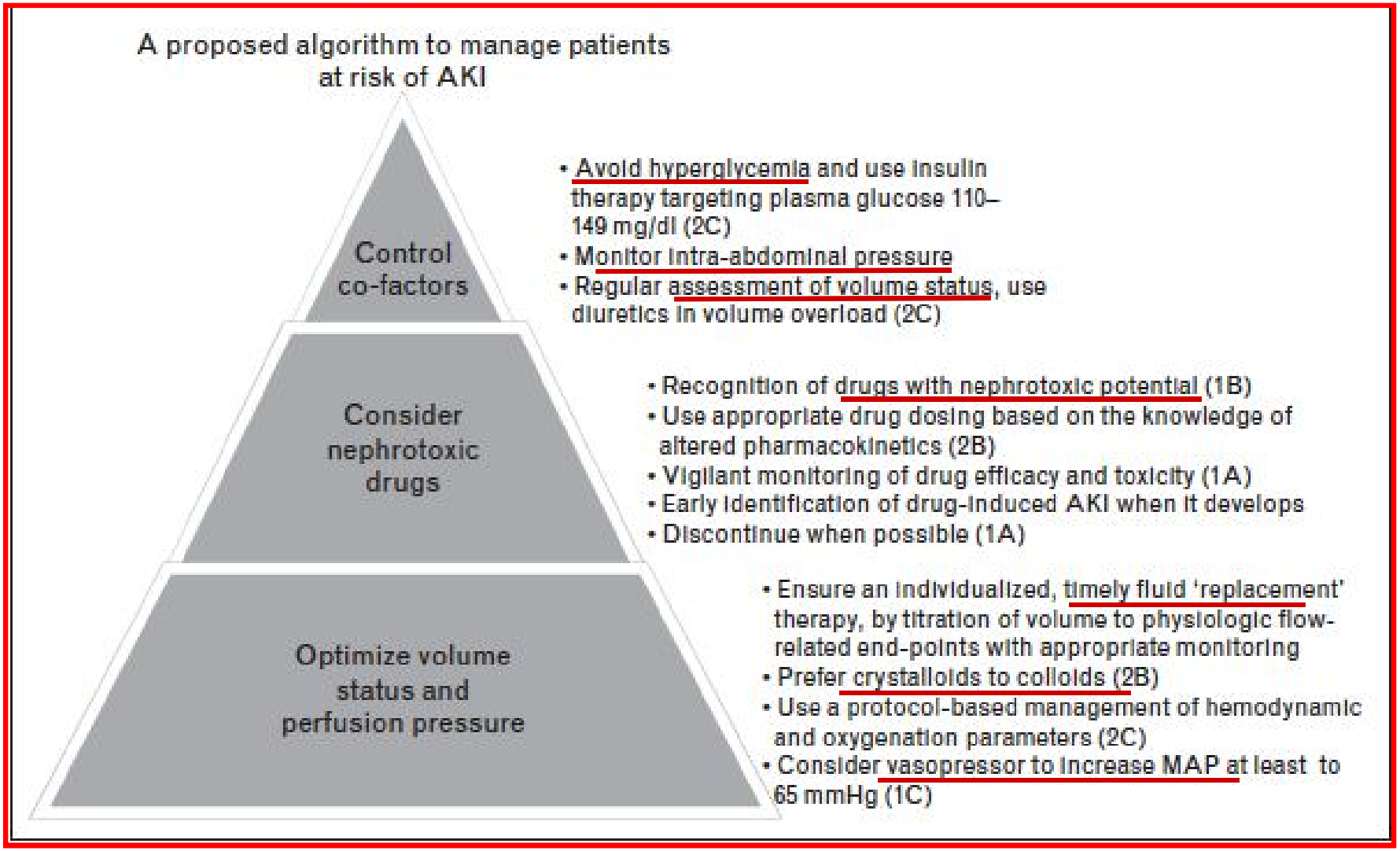
Figures indicate approximate osmolarities (mOsm/L)




HS 1.5mmol/K/day x 4 days
NO Diuretics
215
6
85
45
30
1.4
Crea
Urea
U/C
0 1 2 3 4 5 6 7 8
giorni

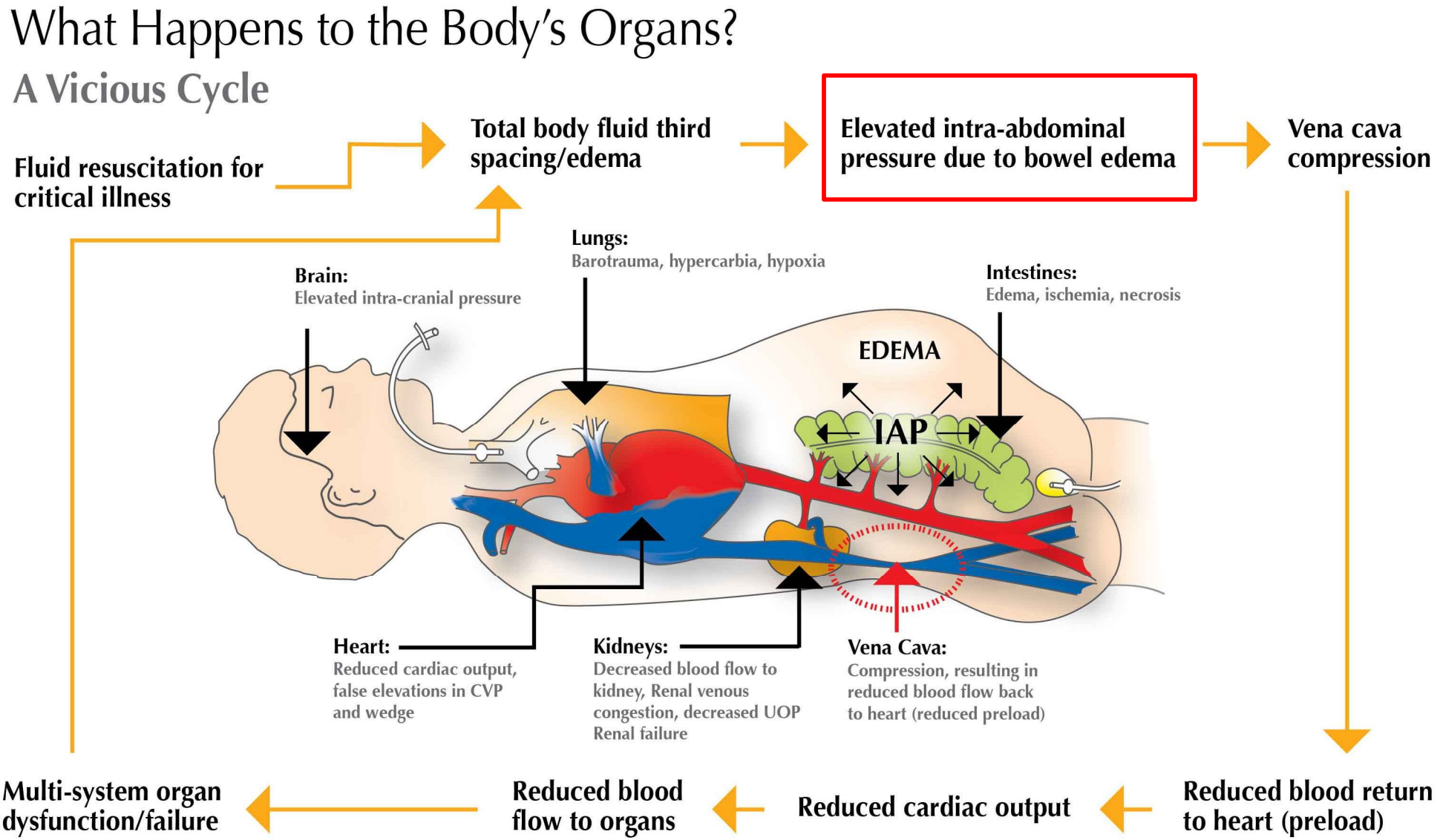
CURRENT OPINION

Protocoled resuscitation and the prevention of acute kidney injury



Curr Opin Crit Care 2012, 18:000–000

The "messy" cross-talk among organs



Prowle et al. Critical Care 2012, 16:230
http://ccforum.com/content/16/4/230

CRITICAL CARE

REVIEW

Clinical review: Volume of fluid resuscitation and the incidence of acute kidney injury - a systematic review

John R Prowle[1], Horng-Ruey Chua[2], Sean M Bagshaw[3] and Rinaldo Bellomo*[4]

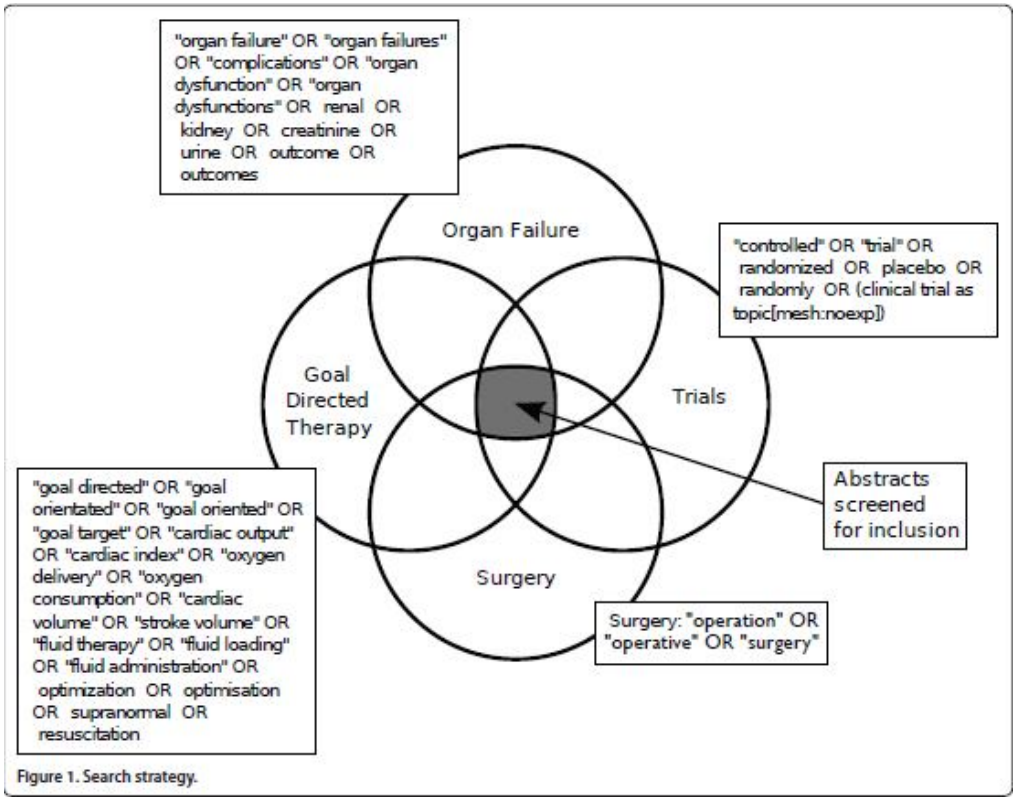


Figure 1. Search strategy.

CRITICAL CARE

REVIEW

Clinical review: Volume of fluid resuscitation and the incidence of acute kidney injury - a systematic review

John R Prowle[1], Horng-Ruey Chua[2], Sean M Bagshaw[3] and Rinaldo Bellomo*[4]

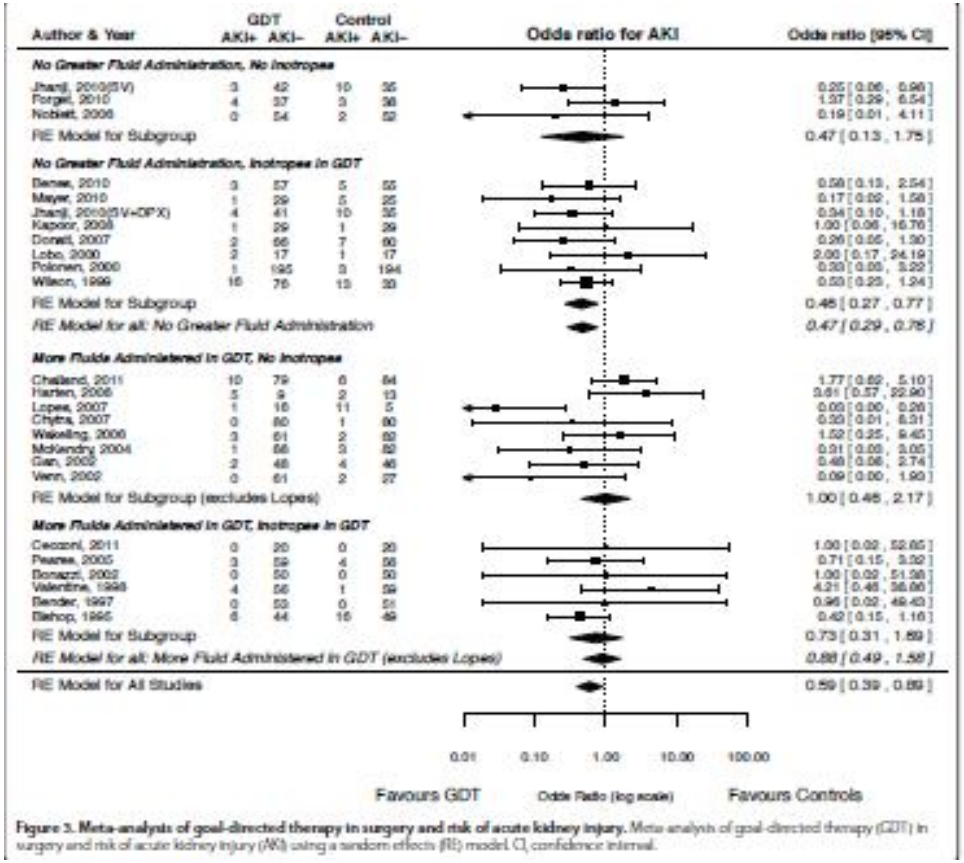


Figure 3. Meta-analysis of goal-directed therapy in surgery and risk of acute kidney injury. Meta-analysis of goal-directed therapy (GDT) in surgery and risk of acute kidney injury (AKI) using a random effects (RE) model. CI, confidence interval.

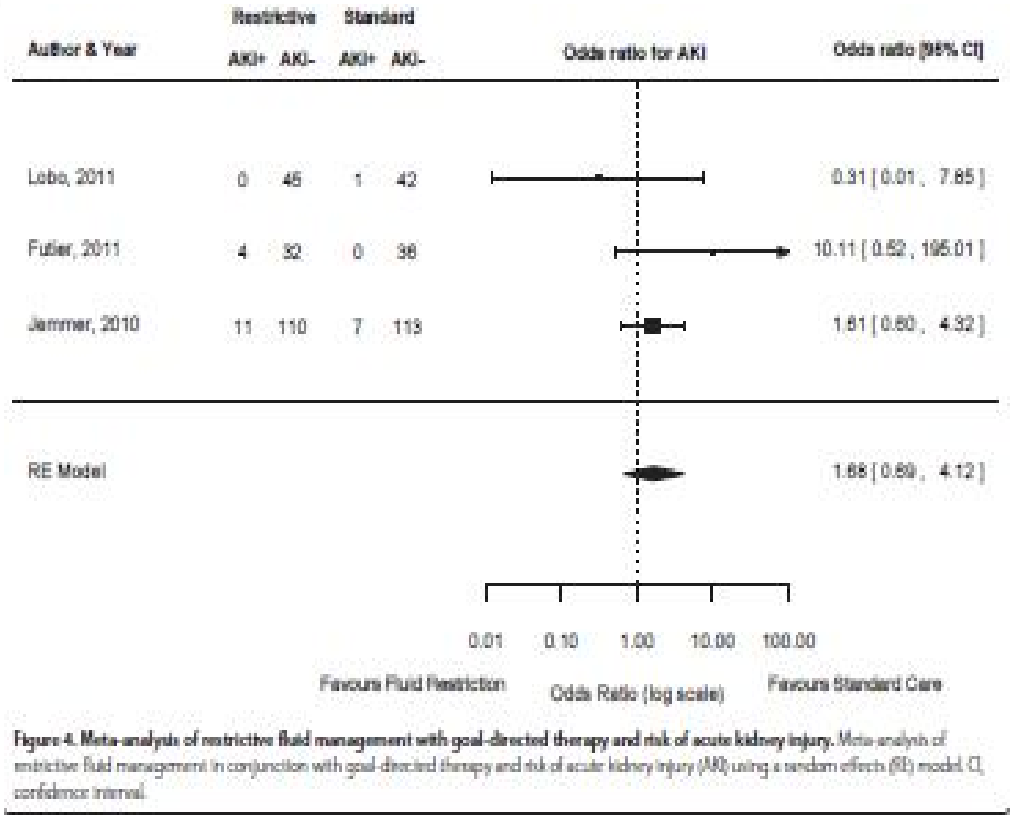
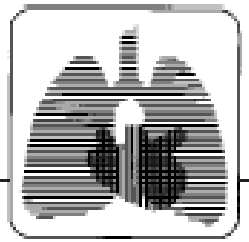


Figure 4. Meta-analysis of restrictive fluid management with goal-directed therapy and risk of acute kidney injury. Meta-analysis of restrictive fluid management in conjunction with goal-directed therapy and risk of acute kidney injury (AKI) using a random effects (RE) model. CI, confidence interval.



critical care reviews

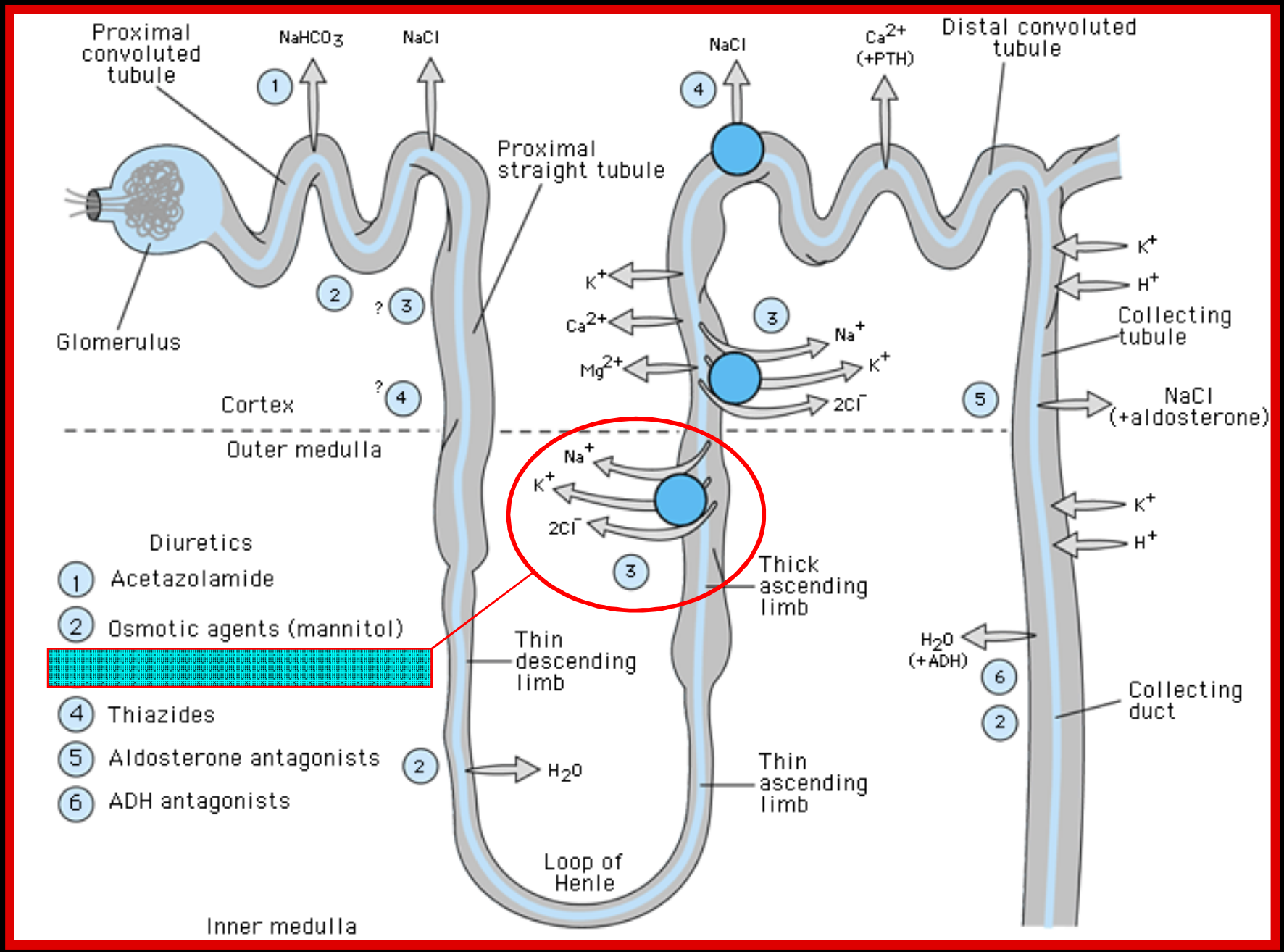
Bad Medicine*

Low-Dose Dopamine in the ICU

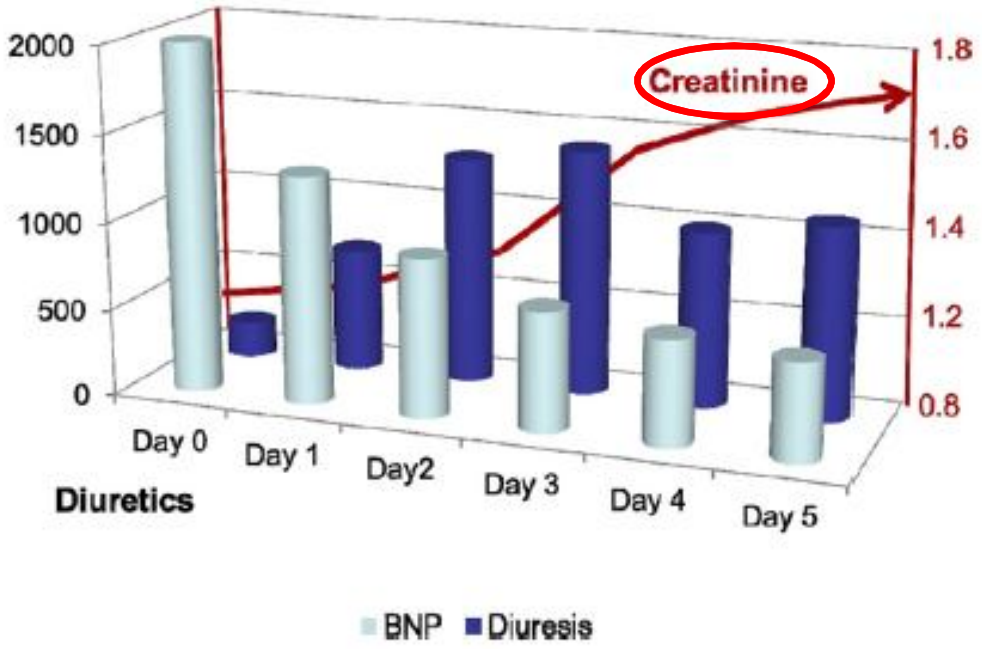
Cheryl L. Holmes, MD; and Keith R. Walley, MD

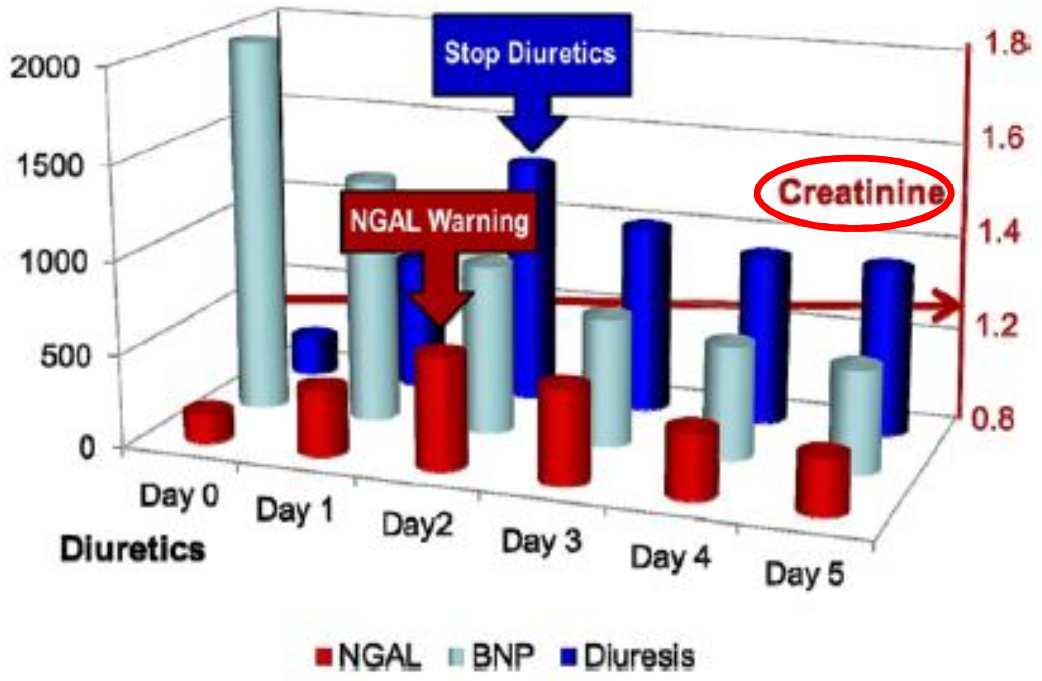
CHEST 2003; 123:1266–1275

High dose diuretics?? ……THE DEVIL'S DRUGS !!!



CRS and Diuretics





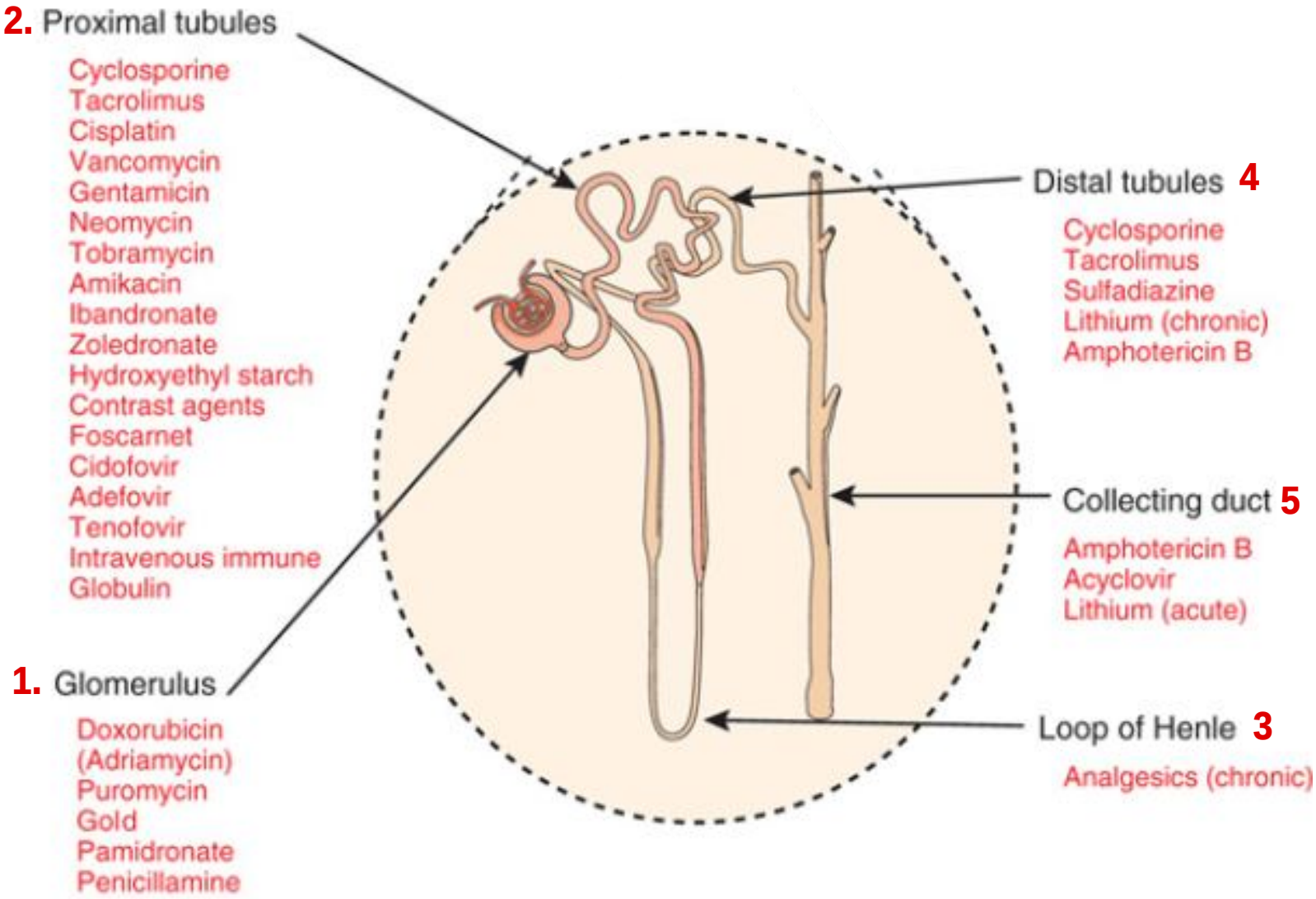
Seminars in Nephrology, Vol 32, No 1, January 2012, pp 121-128

Established in 1871
Swiss Medical Weekly
Formerly: Schweizerische Medizinische Wochenschrift
The European Journal of Medical Sciences

Review article: Current opinion | Published 14 August 2012, doi:10.4414/smw.2012.13662
Cite this as: Swiss Med Wkly. 2012;142:w13662

New insights in acute kidney failure in the critically ill

Zaccaria Ricci[a], *Claudio Ronco*[b]



Strategies for the prevention of contrast-induced acute kidney injury

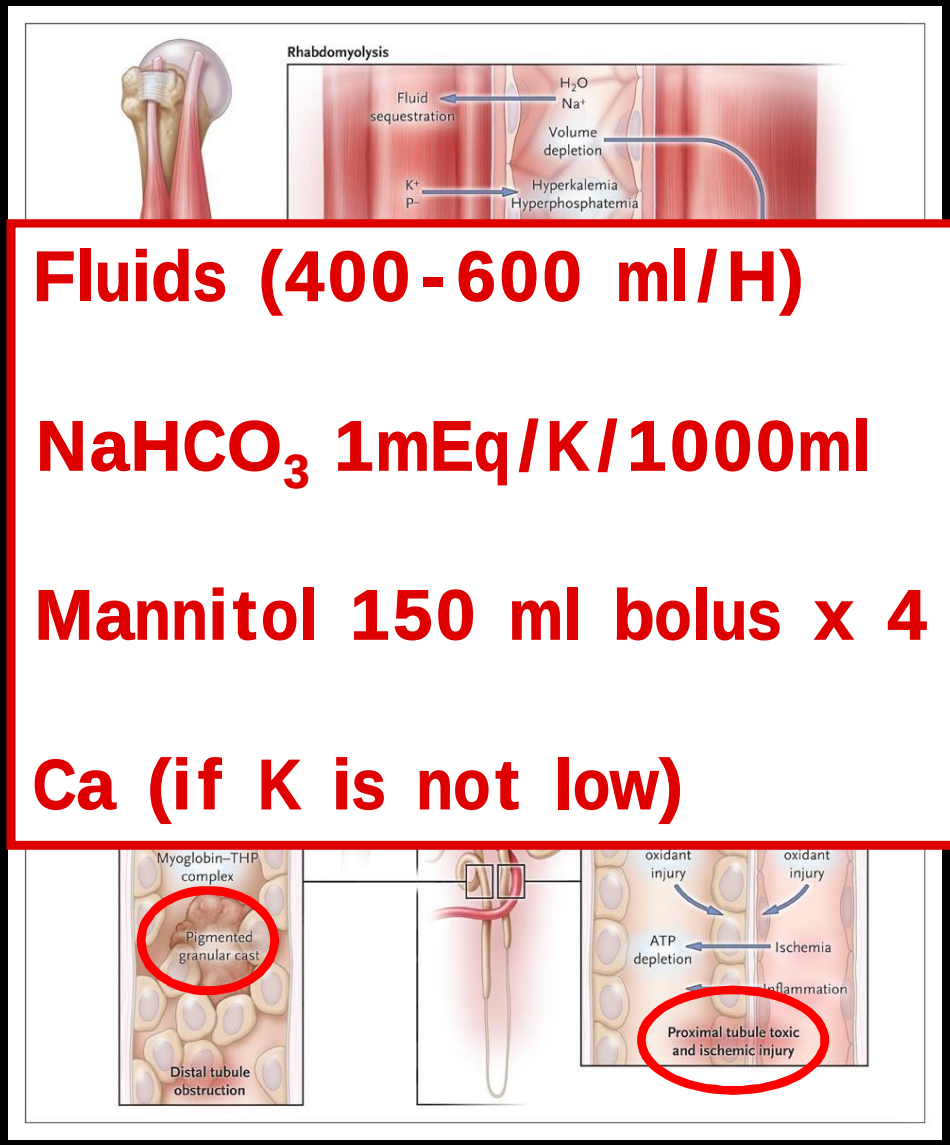
Steven D. Weisbord[a,b] and Paul M. Palevsky[a,b]

Current Opinion in Nephrology and Hypertension 2010, 19:539–549

Table 4 Preventive interventions for contrast-induced acute kidney injury

Category of intervention	Specific strategies
Identification of high-risk patients	Identify patients with known risk factors
Consider alternative imaging procedures	Consider ultrasound, nuclear imaging, noncontrast computed tomography
	Consider use of CO_2 for select angiographic procedures
Intravenous fluids	Intravenous isotonic saline or intravenous isotonic sodium bicarbonate
	Hospitalized patients: 1 ml/kg per h for 12 h prior to and 12 h following the procedure
	Outpatients/urgent procedures: 3 ml/kg per h for 1 h prior to the procedure and 1–1.5 ml/kg per h for 4–6 h following the procedure
N-Acetylcysteine	1200 mg orally twice daily on the day prior to and the day of the procedure
Medication discontinuation	Discontinue selective and nonselective nonsteroidal anti-inflammatory medications on day prior to procedure and hold for 2–4 days following procedure
	Discontinue metformin at time of procedure and restart once postprocedure renal function deemed stable[a]
Contrast agent	Use iso-osmolal or low-osmolal contrast other than iohexol or ioxaglate
	Utilize lowest necessary dose of contrast
Follow-up assessment of kidney function	Check serum creatinine 48–72 h following procedure

Pathophysiological Mechanisms in Rhabdomyolysis-Induced Acute Kidney Injury



Fluids (400-600 ml/H)

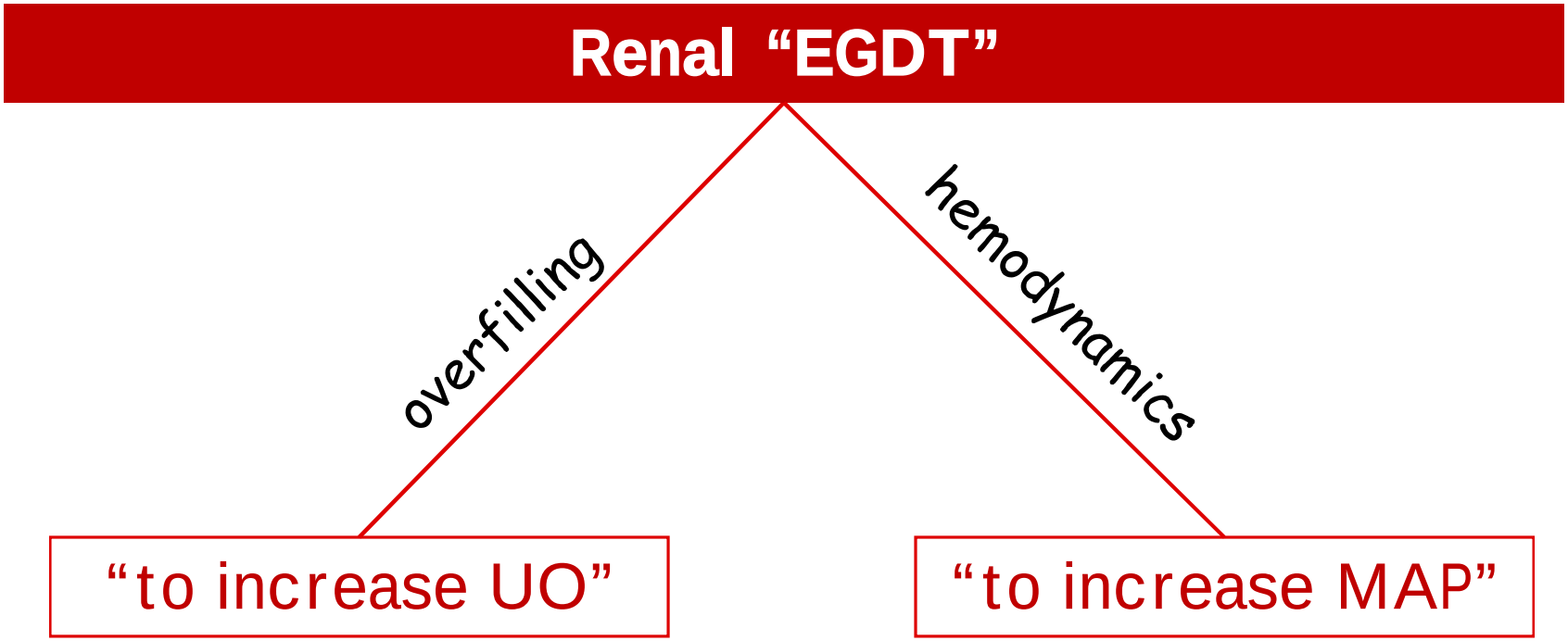
$NaHCO_3$ 1mEq/K/1000ml

Mannitol 150 ml bolus x 4

Ca (if K is not low)

Bosch X et al. N Engl J Med 2009;361:62-72

The NEW ENGLAND JOURNAL of MEDICINE



- Myoglobinuria
- Dye
- Tumor lysis
- Antiviral
- Platinum

- Chronic hypertension
- Elderly
- Drugs side effects

KIDNEY vs LUNG

RPP	TUBULAR MACHINERY
↓	↓
GFR	H_2O, ELECTROLYTES, pH
↓	↓
OLIGURIA	POOR URINE QUALITY
↓	↓
"PUMP" FAILURE	**"PARENCHIMAL" FAILURE**

KEY POINTS

- **RULE OUT POST-RENAL**
- **CHECK FULLNESS, MAP, IAP, [Alb]p**
- **URINE, "Fast Cr Cl" & NEW MARKERS**
- **STOP DIURETICS & "TOXIC" DRUGS**
- ***MANAGE pH, FLUIDS, ELECTROLYTES, CALORIES***
- **"EARLY" CRRT**

Be kind to the kidney and.....
it will repay you!

schirald@gmail.com