

FLOW-RATE MONITORING IS USELESS

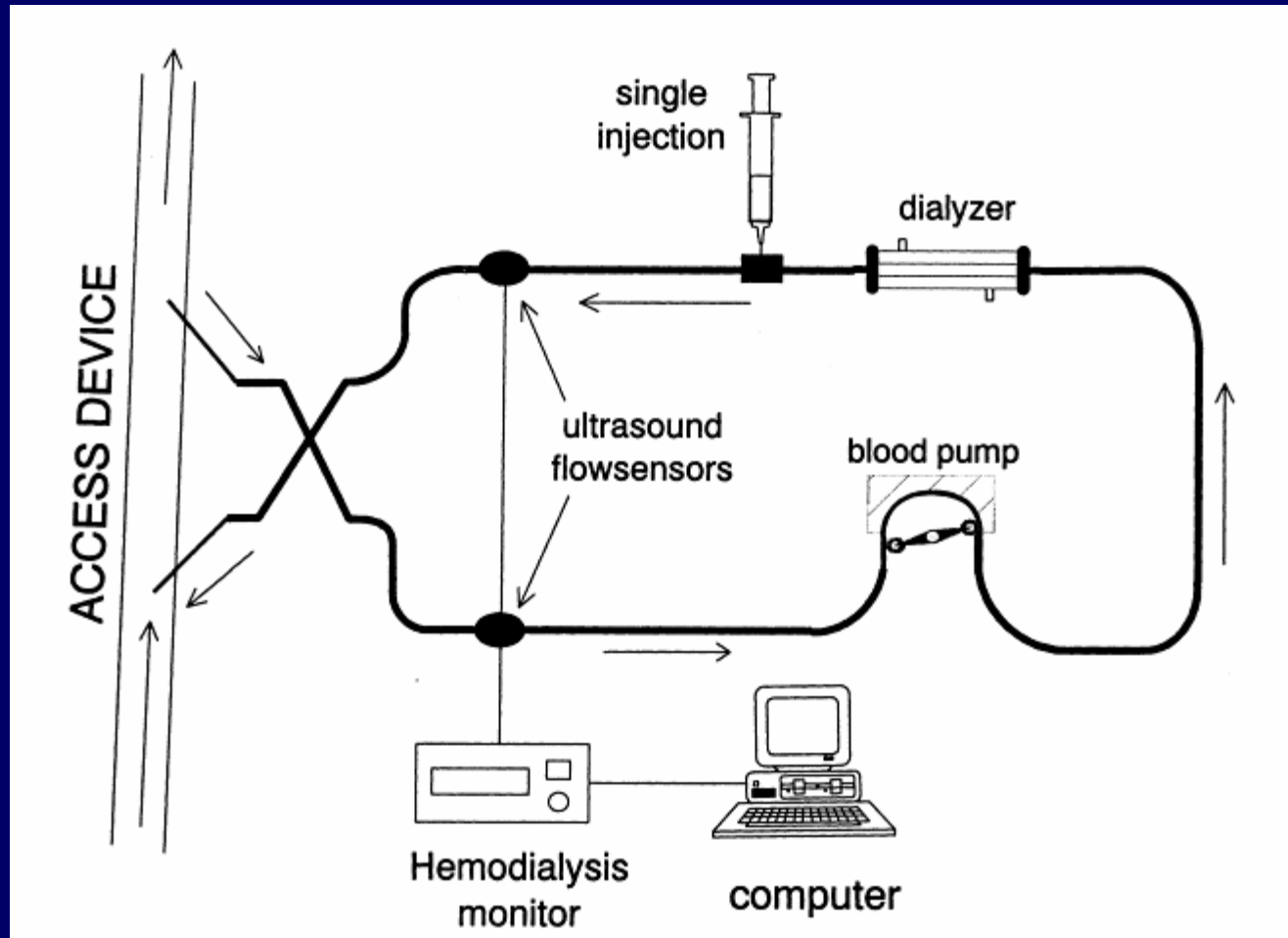
William D. Paulson, MD
Augusta VA Medical Center
and
Medical College of Georgia
Augusta, Georgia, USA



OUTLINE

- **Q SURVEILLANCE PARADIGM**
- **RESULTS OF RCT'S**
- **WHY ARE OUTCOMES DISAPPOINTING?**
- **SURVEILLANCE: THE FALSE PARADIGM**

ULTRASOUND DILUTION METHOD



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Q SURVEILLANCE PARADIGM

PROGRESSIVE STENOSIS

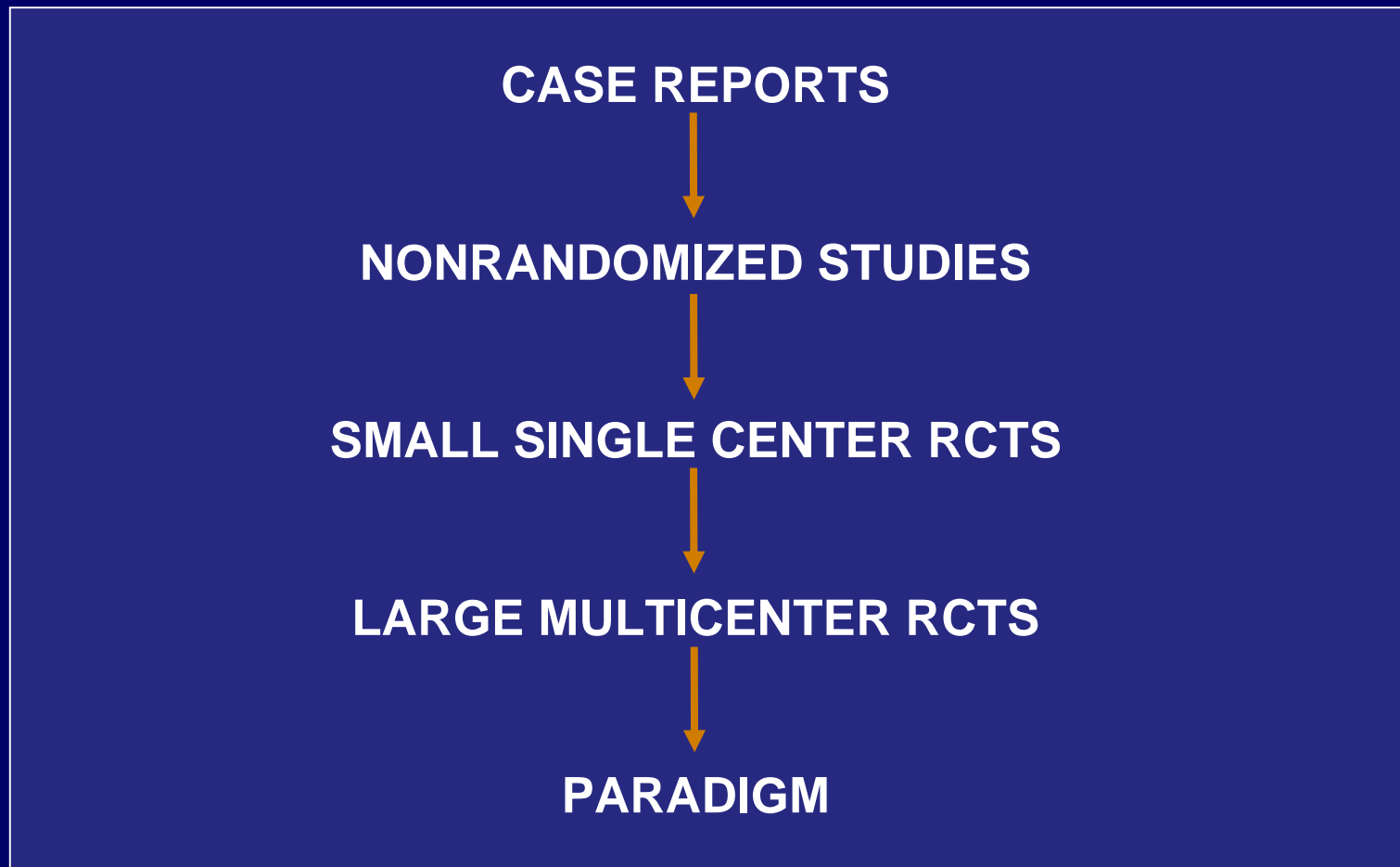


DECREASED Q

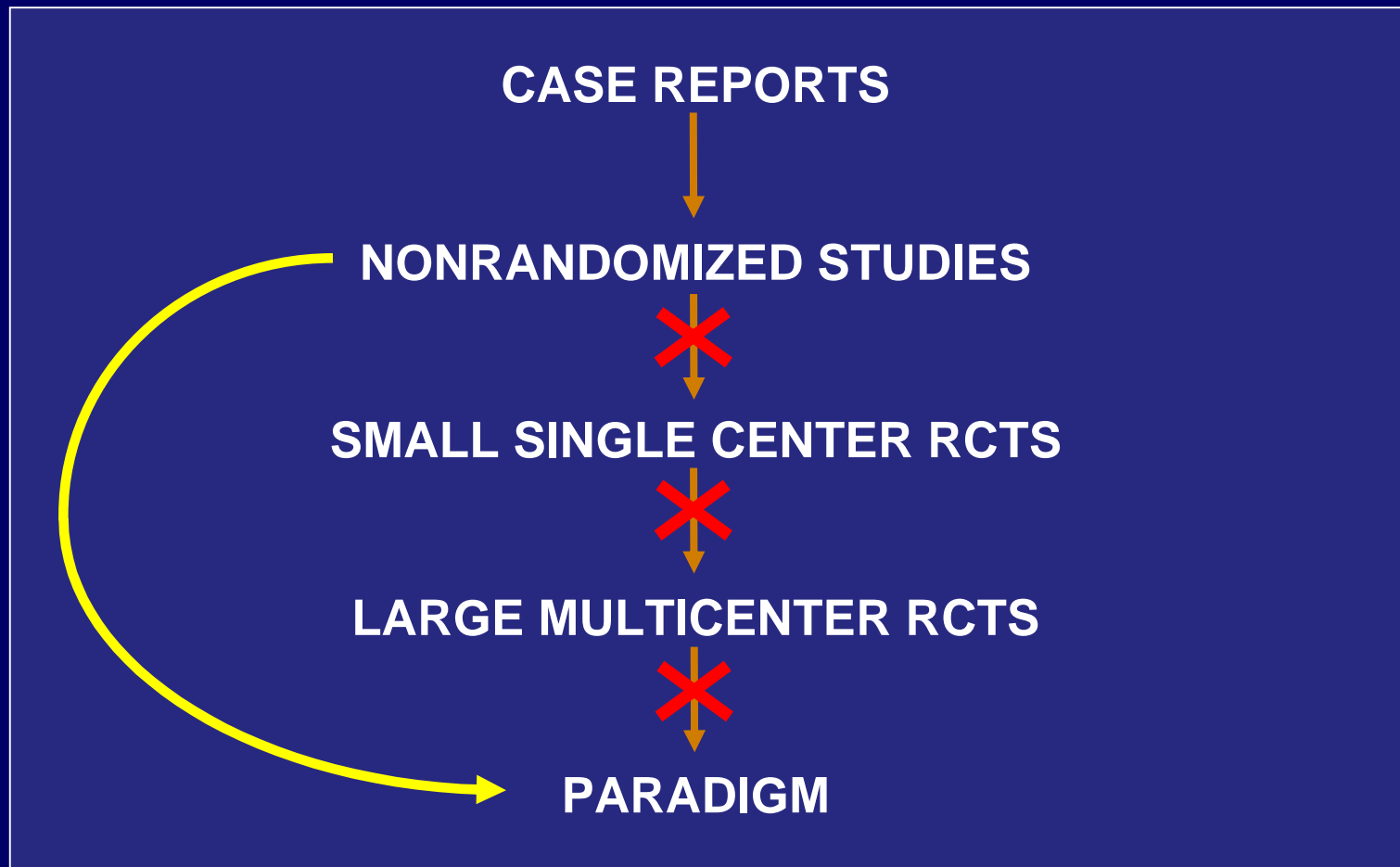


ACCESS THROMBOSIS & FAILURE

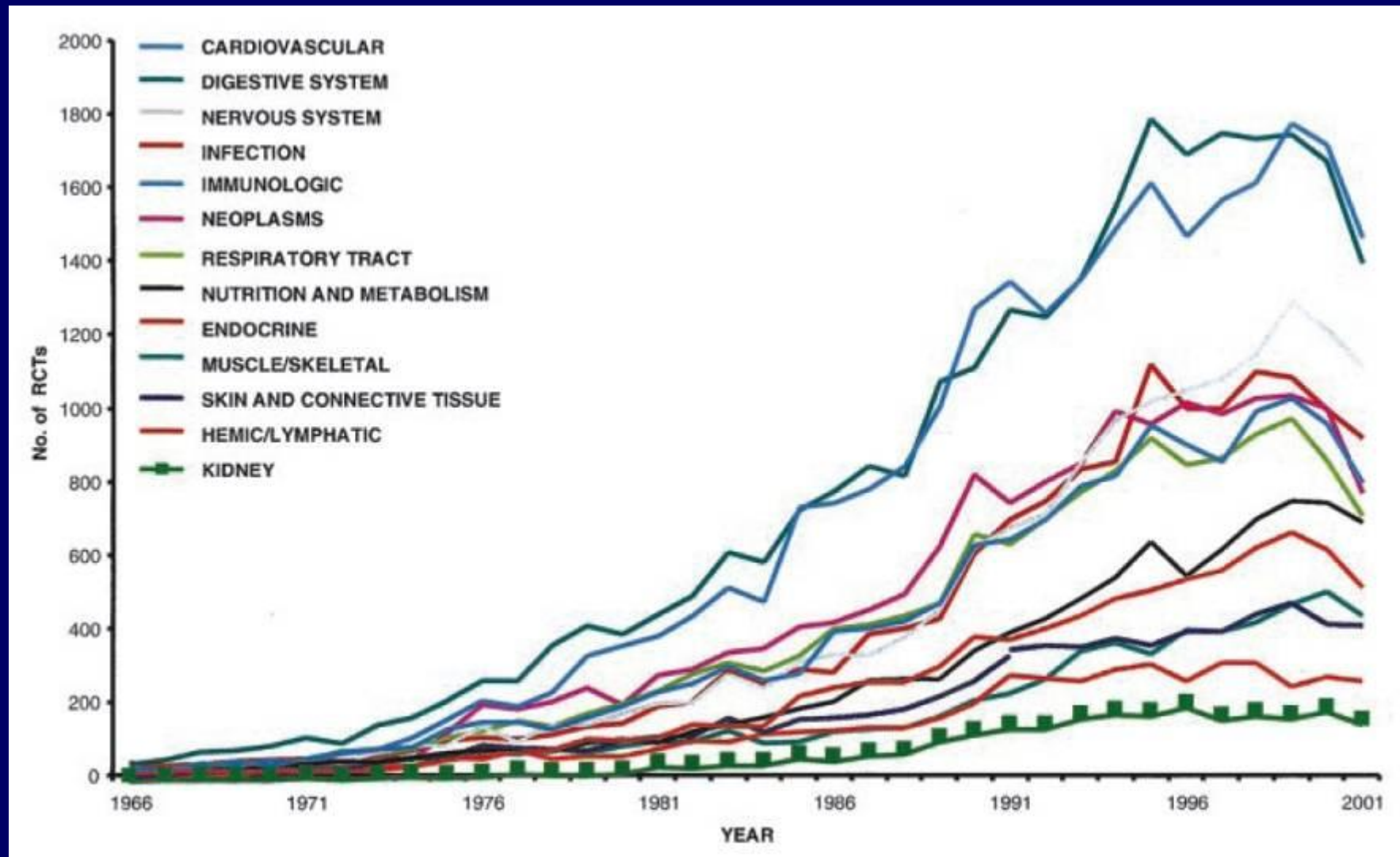
HOW PARADIGMS SHOULD BE ESTABLISHED



HOW Q SURVEILLANCE PARADIGM WAS ESTABLISHED



NEPHROLOGY HAS FEWEST RCT'S



Strippoli, JASN 2004

**POOR-QUALITY REPORTS ARE ASSOCIATED WITH
BIASED ESTIMATES OF INTERVENTION EFFECTS**

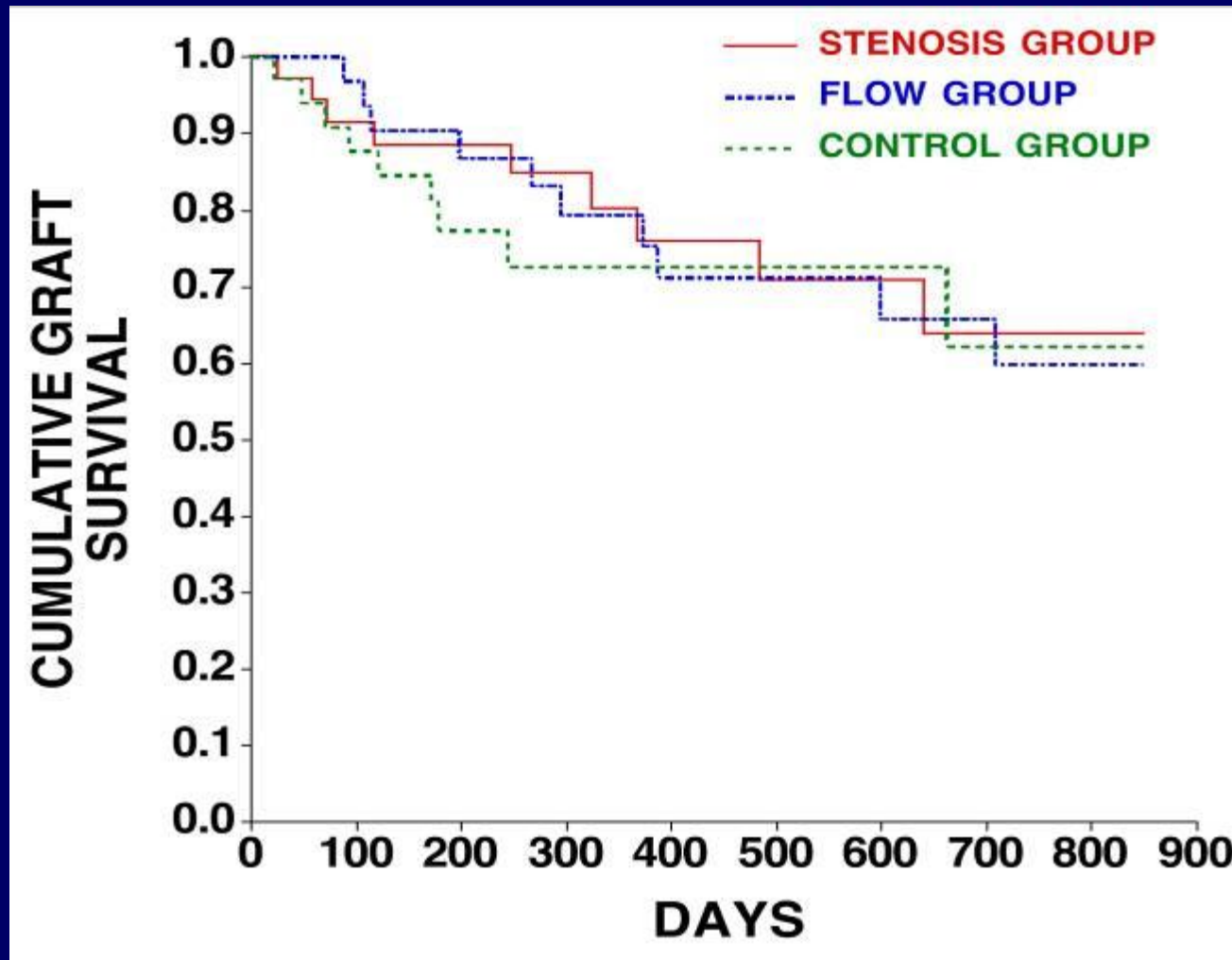
**THIS LEADS TO OVERESTIMATING TRUE EFFECTS OF
INTERVENTIONS**

Strippoli, JASN 2004

OUTLINE

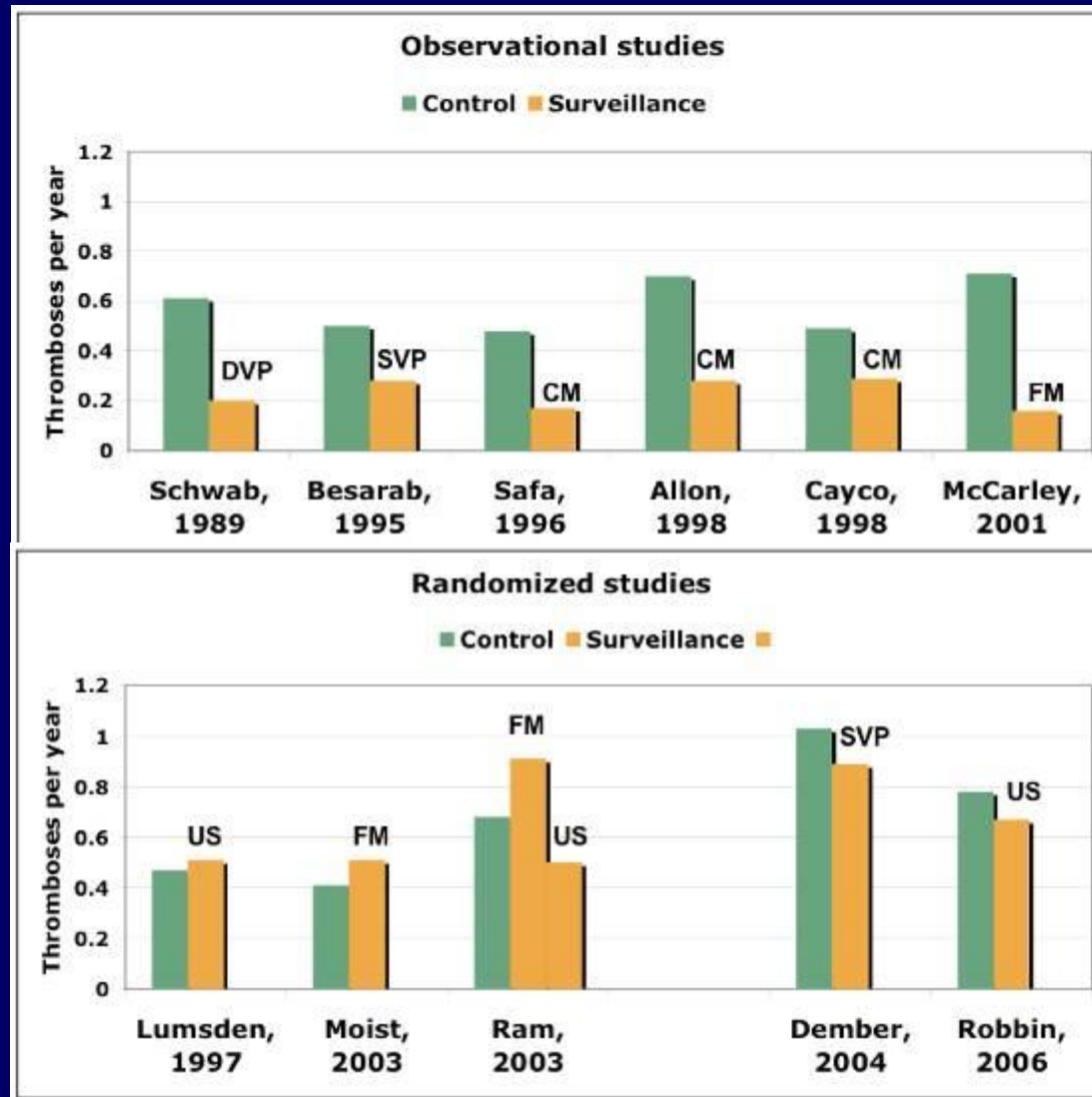
- **Q SURVEILLANCE PARADIGM**
- **RESULTS OF RCT'S**
 - **Q SURVEILLANCE DOES NOT IMPROVE GRAFT SURVIVAL OR REDUCE THROMBOSIS**
 - **BENEFIT OF AVF SURVEILLANCE NOT ESTABLISHED**
- **WHY ARE OUTCOMES DISAPPOINTING?**
- **SURVEILLANCE: THE FALSE PARADIGM**

SURVEILLANCE BY ANY METHOD DOES NOT IMPROVE GRAFT SURVIVAL



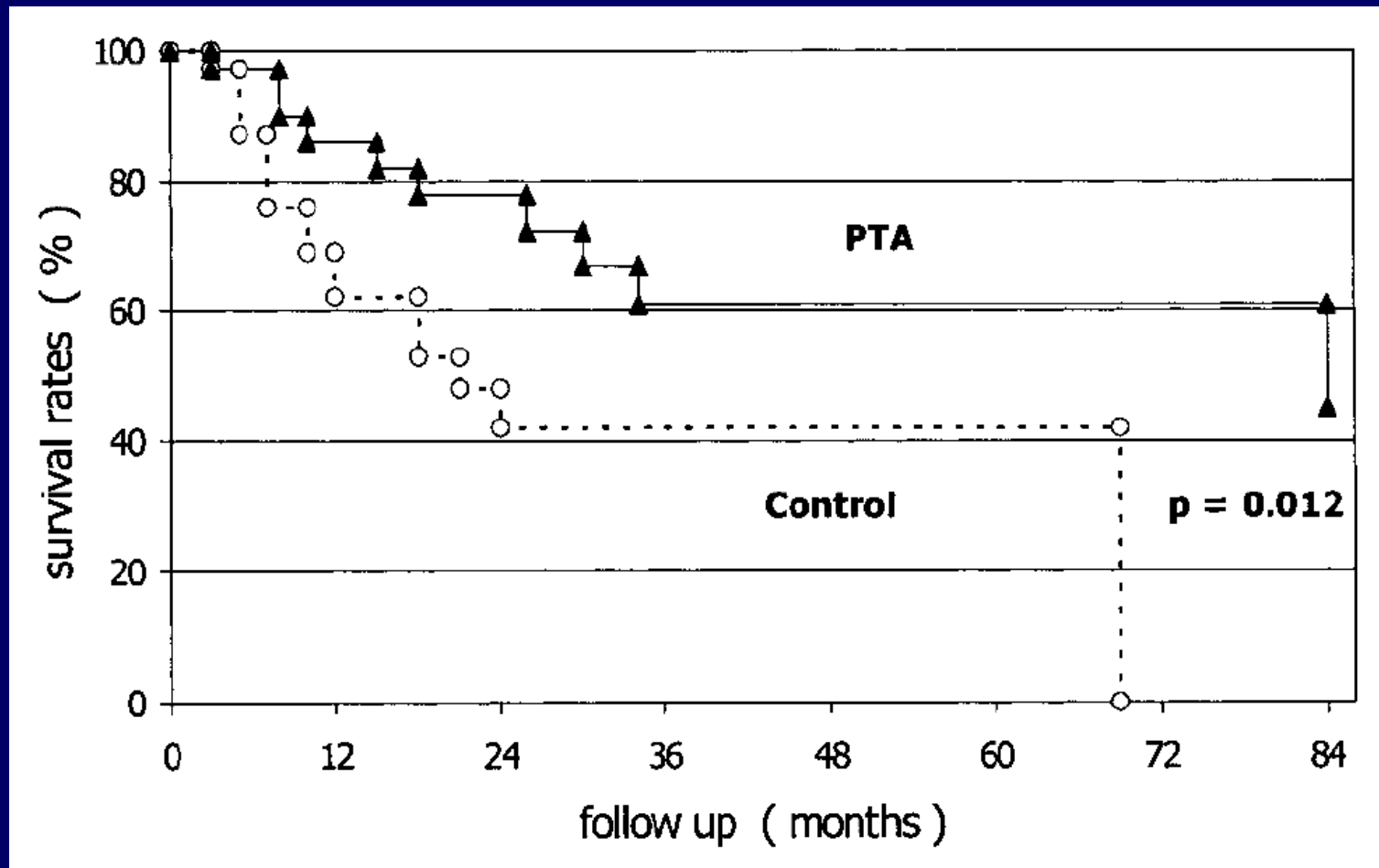
Ram, KI 2003

OBSERVATIONAL STUDIES OF GRAFT THROMBOSIS WERE BIASED



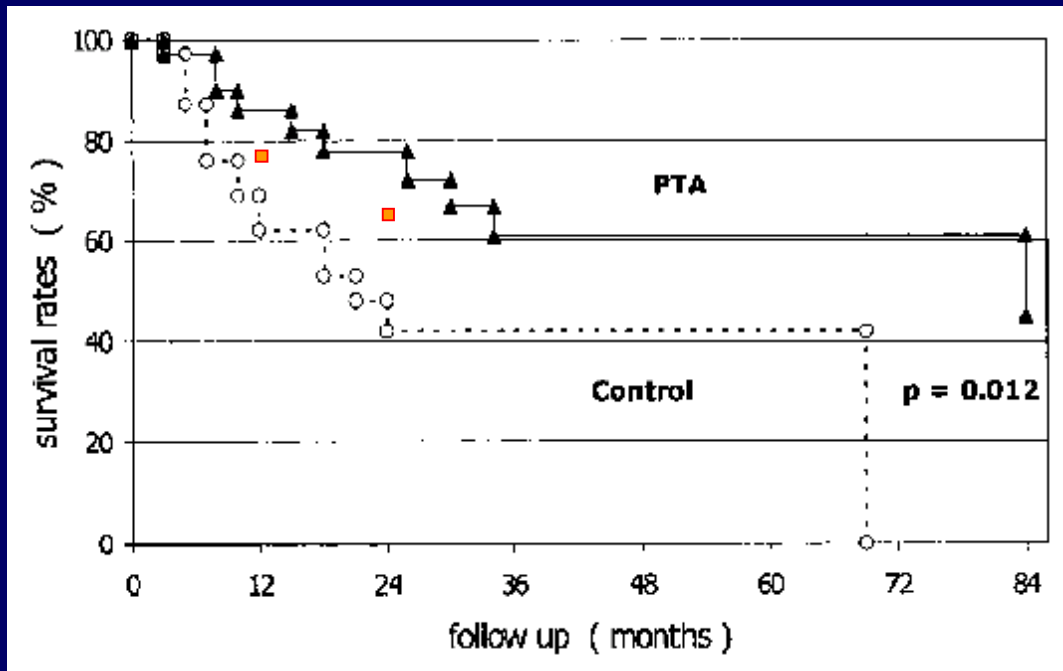
Allon,
NephSAP 2007

Q SURVEILLANCE IMPROVED AVF SURVIVAL

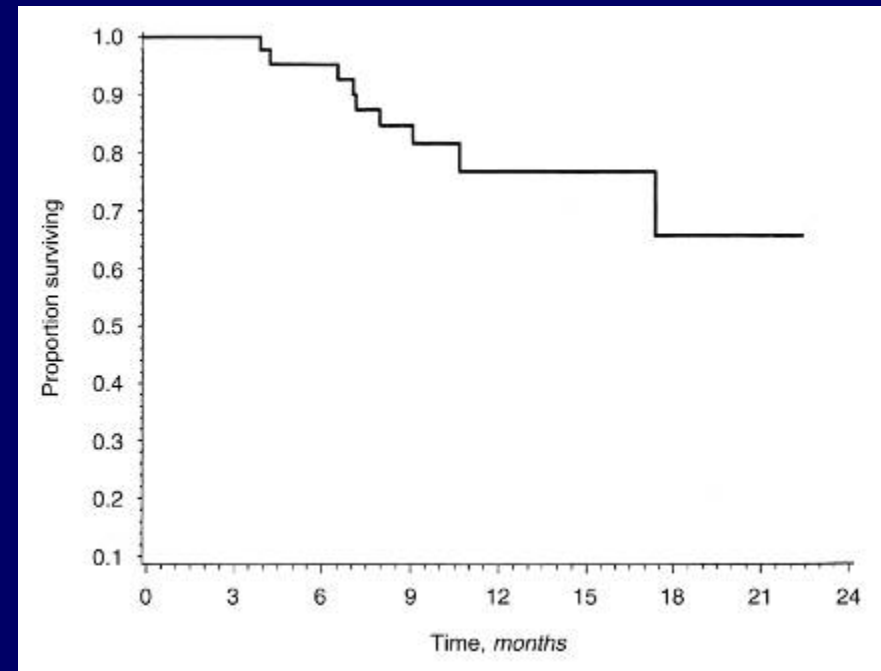


Tessitore, JASN 2003

WAS FAILURE RATE TOO HIGH IN CONTROL GROUP?



Tessitore, JASN 2003

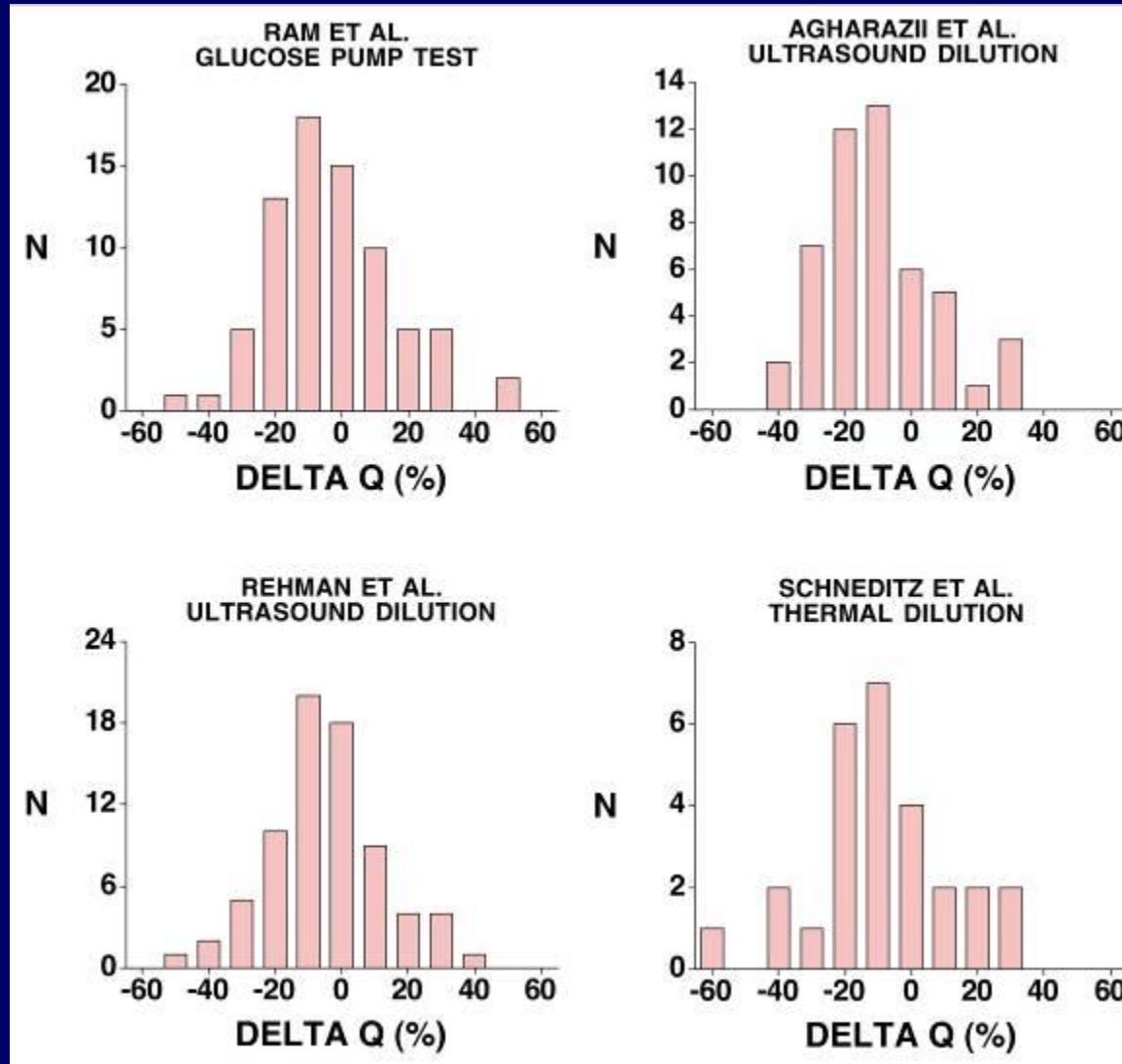


Allon, KI 2001

OUTLINE

- Q SURVEILLANCE PARADIGM
- RESULTS OF RCT'S
- **WHY ARE OUTCOMES DISAPPOINTING?**
 - **LARGE HEMODYNAMIC VARIATION**
- SURVEILLANCE: THE FALSE PARADIGM

Q IS NOT STABLE



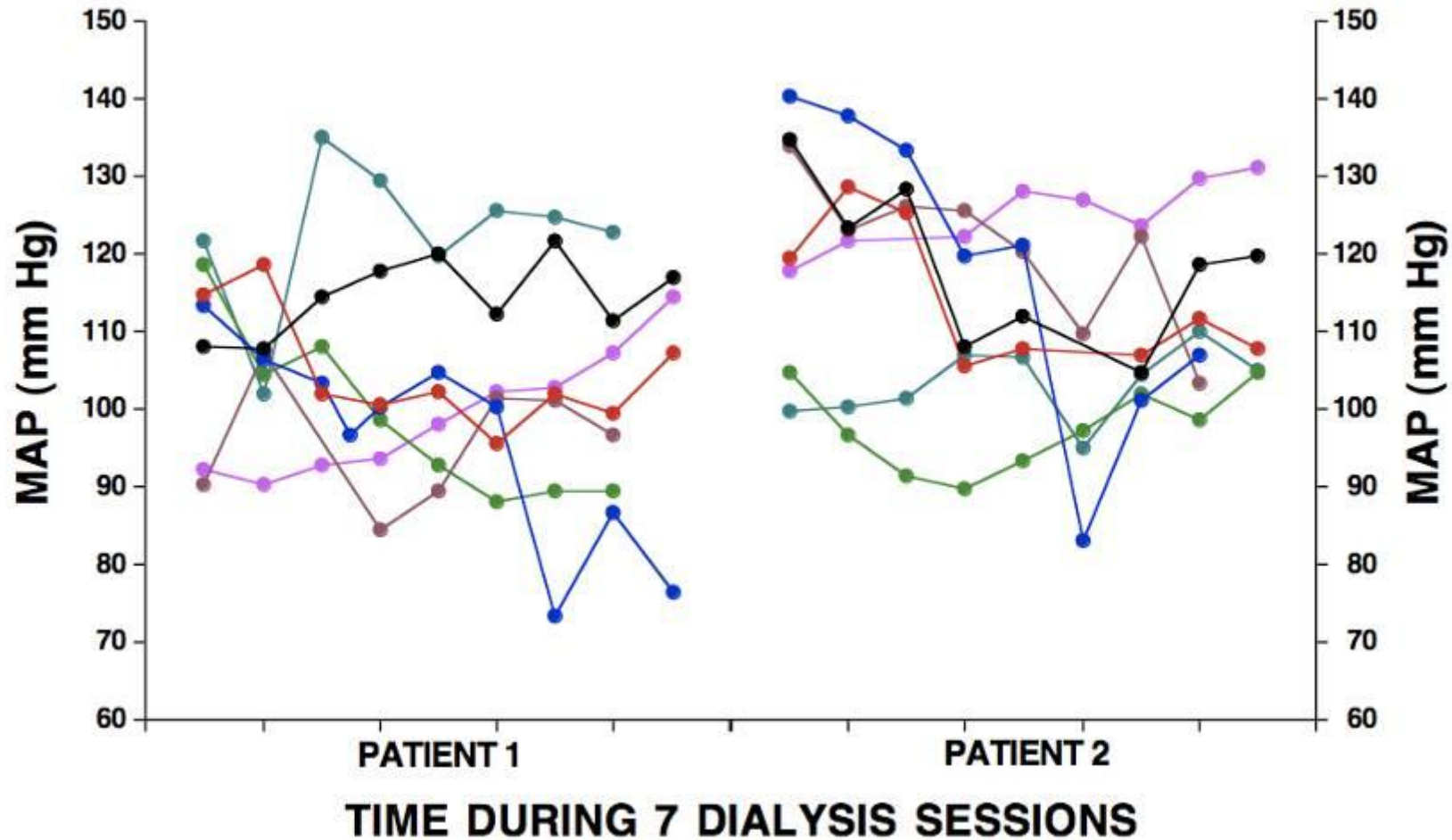
Ram,
Sem Dial 2005

WHY IS Q UNSTABLE?

$$Q = \frac{\text{MAP} - \text{CVP}}{R}$$

MAP, CVP, RESISTANCE ALL VARY DURING DIALYSIS

MAP IN 2 REPRESENTATIVE PATIENTS



WOULD YOU USE THESE TESTS?

ΔQ : -50% \longleftrightarrow +50%

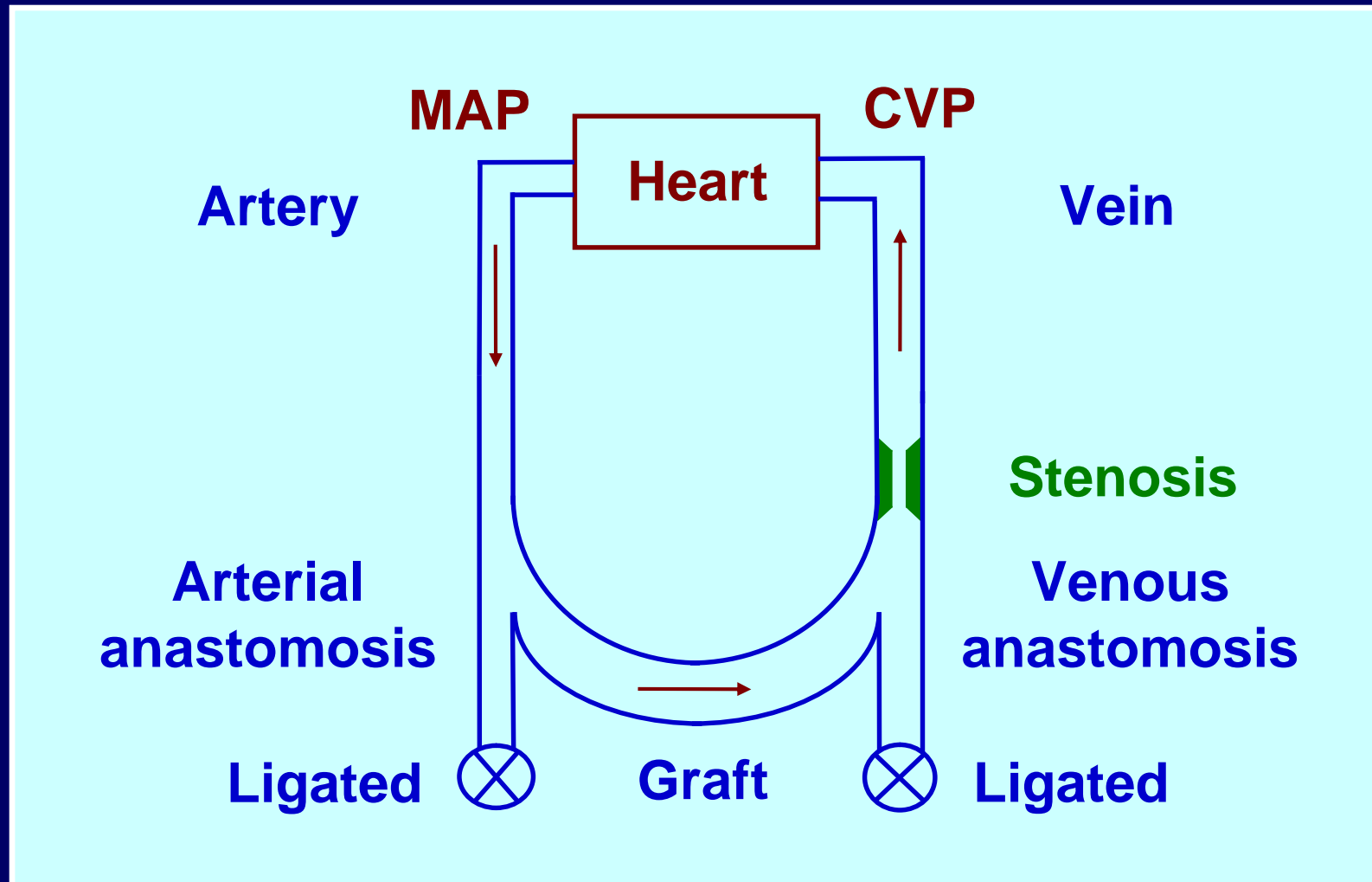
ΔNa : 70 mEq/L \longleftrightarrow 210 mEq/L

ΔHct : 20% \longleftrightarrow 60%

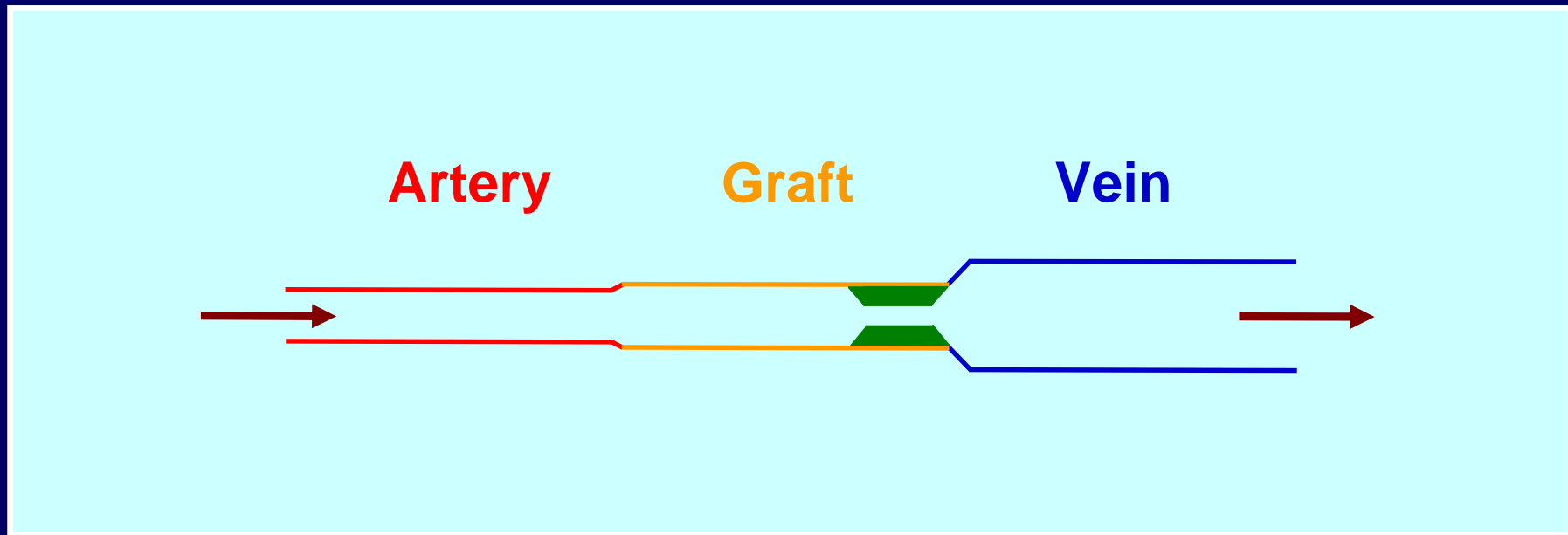
OUTLINE

- Q SURVEILLANCE PARADIGM
- RESULTS OF RCT'S
- **WHY ARE OUTCOMES DISAPPOINTING?**
 - LARGE HEMODYNAMIC VARIATION
 - **Q SUDDENLY FALLS AS STENOSIS PROGRESSES**
- SURVEILLANCE: THE FALSE PARADIGM

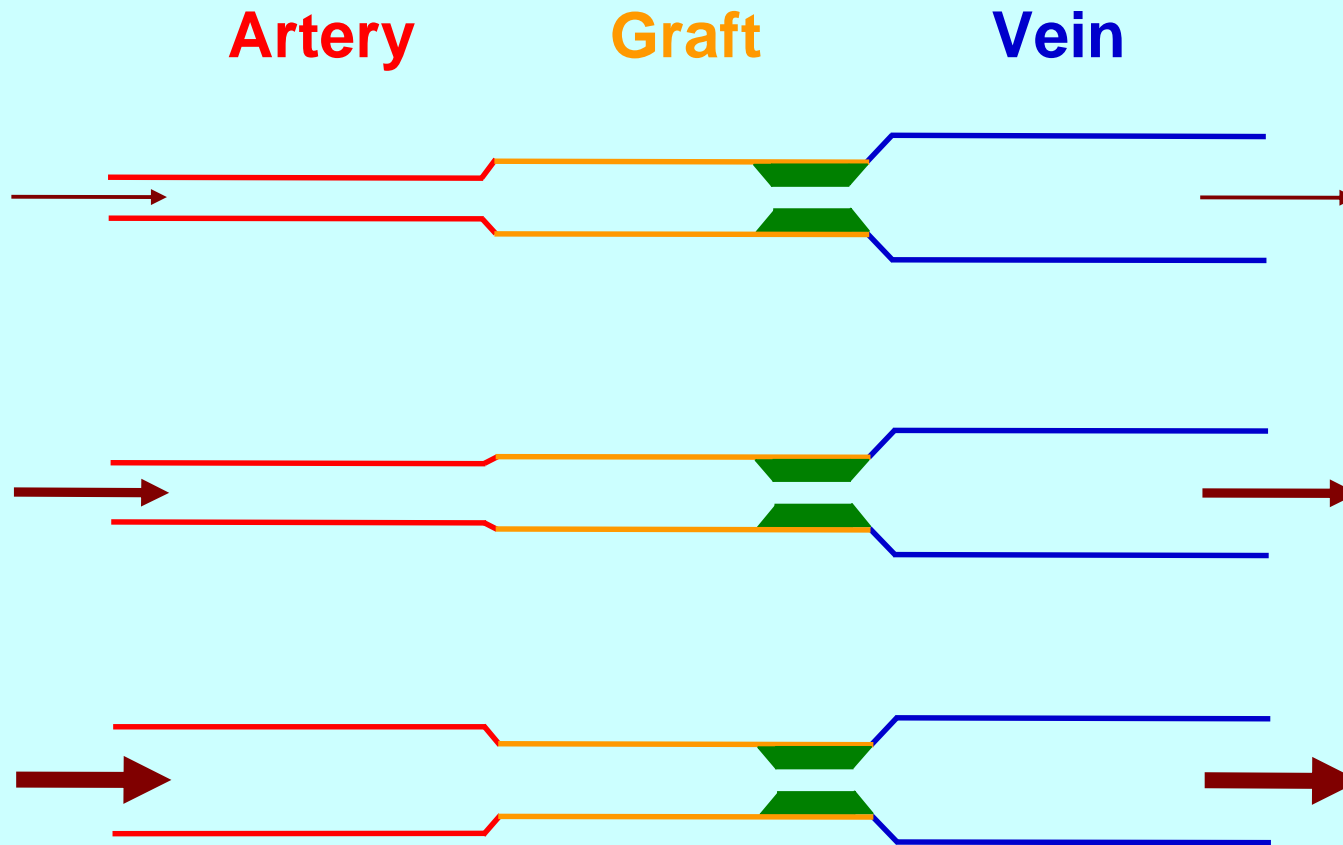
MATHEMATICAL MODEL OF GRAFT



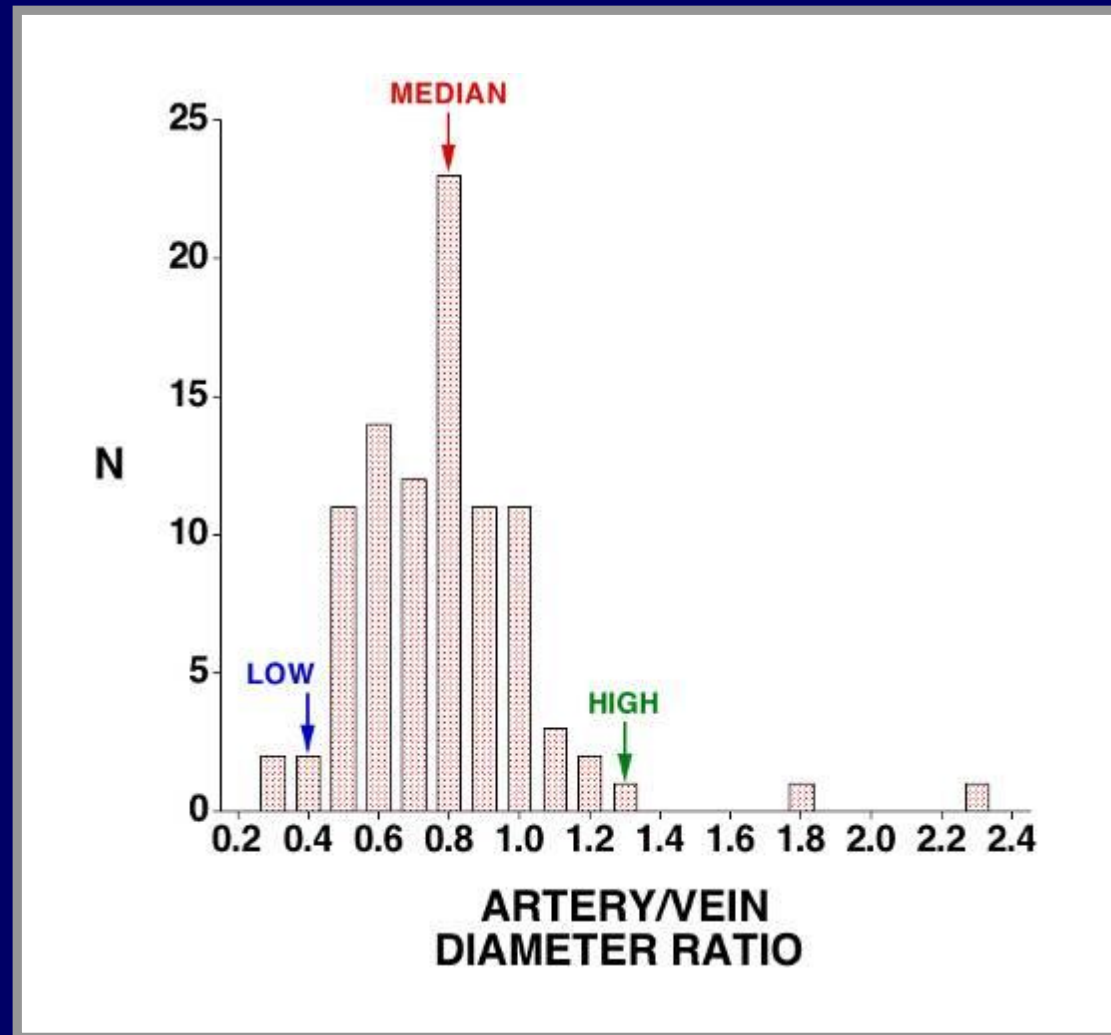
DOES STENOSIS CONTROL Q?



DIAMETERS ALSO CONTROL Q

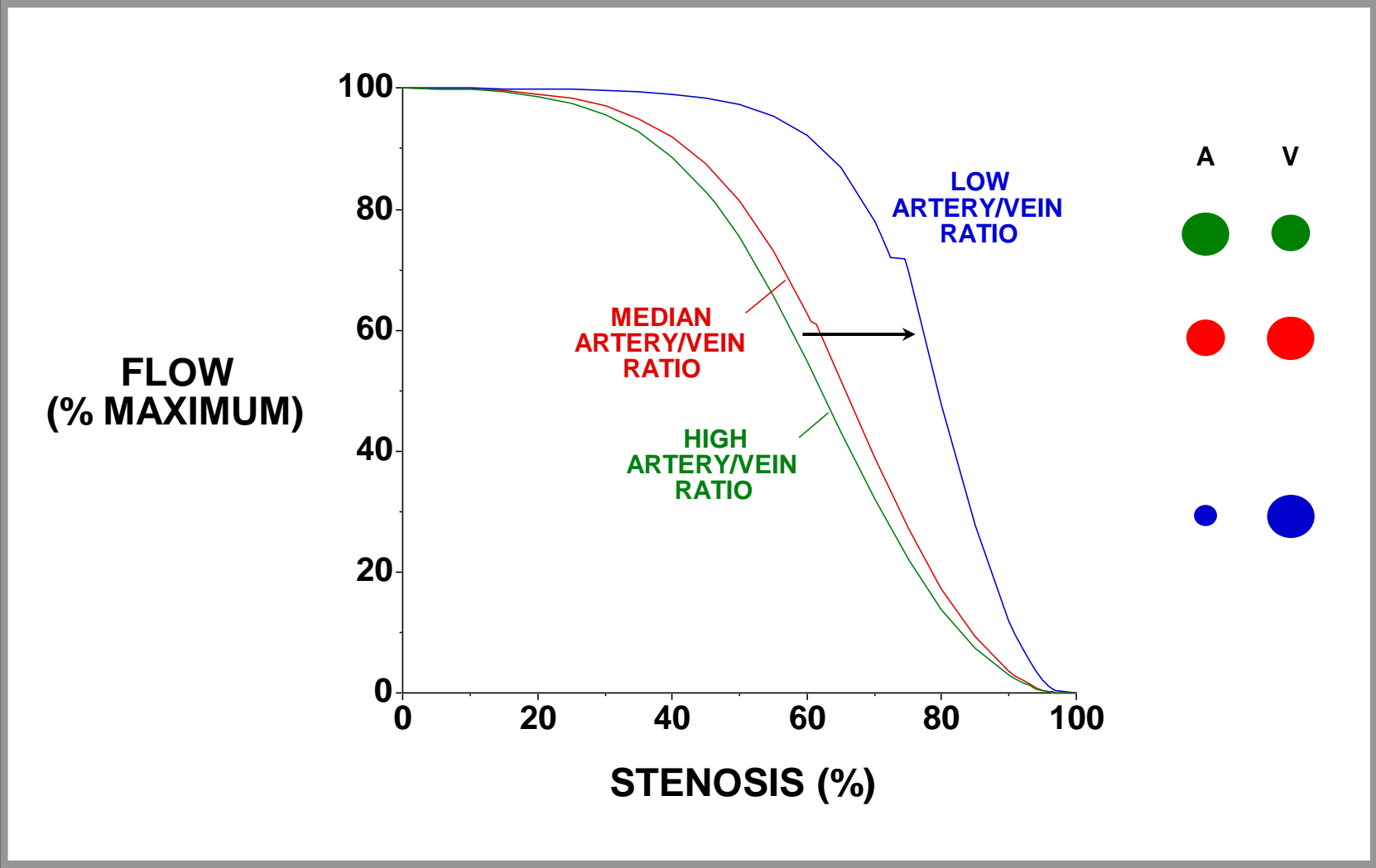


WIDE VARIATION IN ARTERY & VEIN LUMINAL DIAMETERS



White,
CJASN 2006

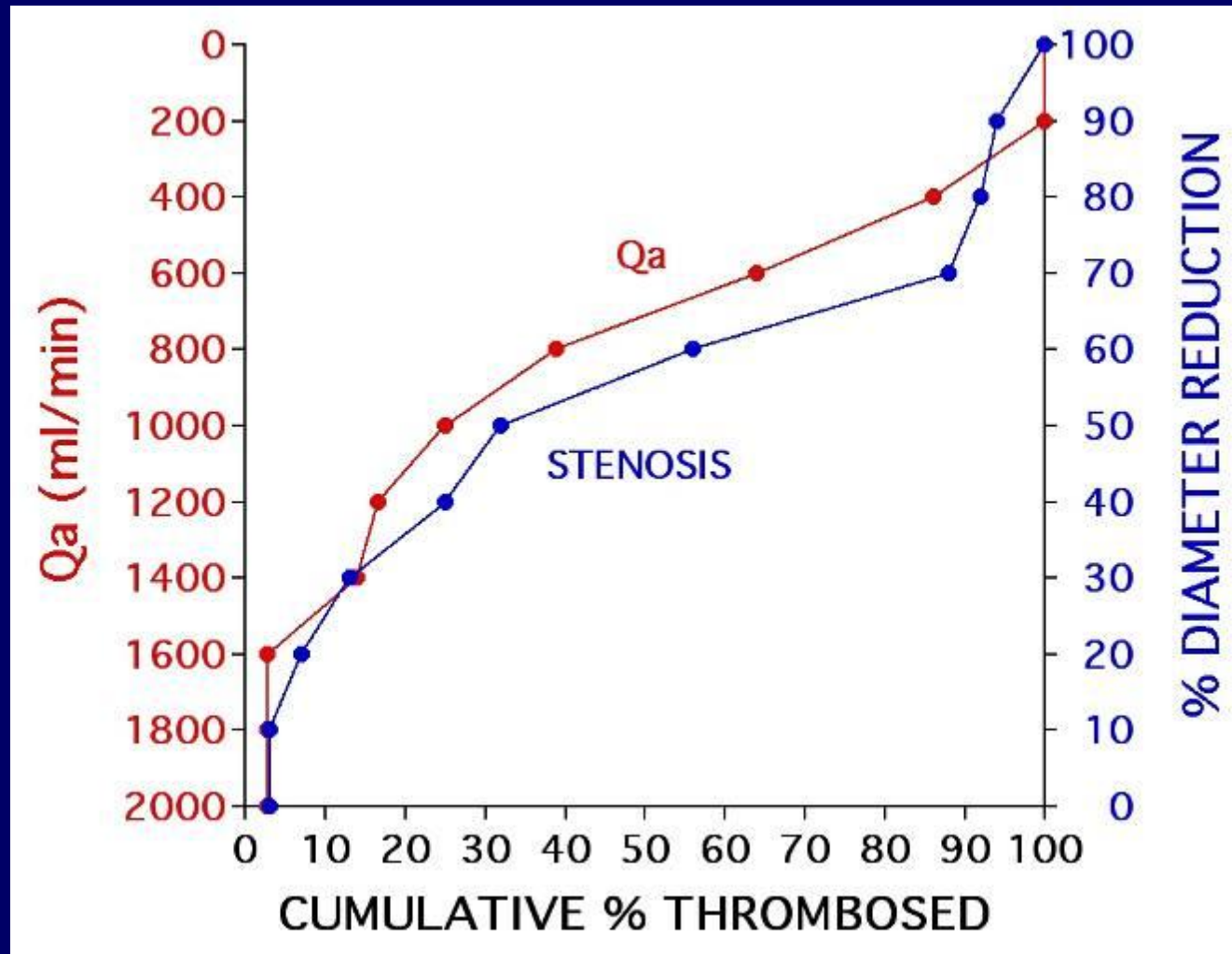
GRAFTS THROMBOSE WITHOUT WARNING



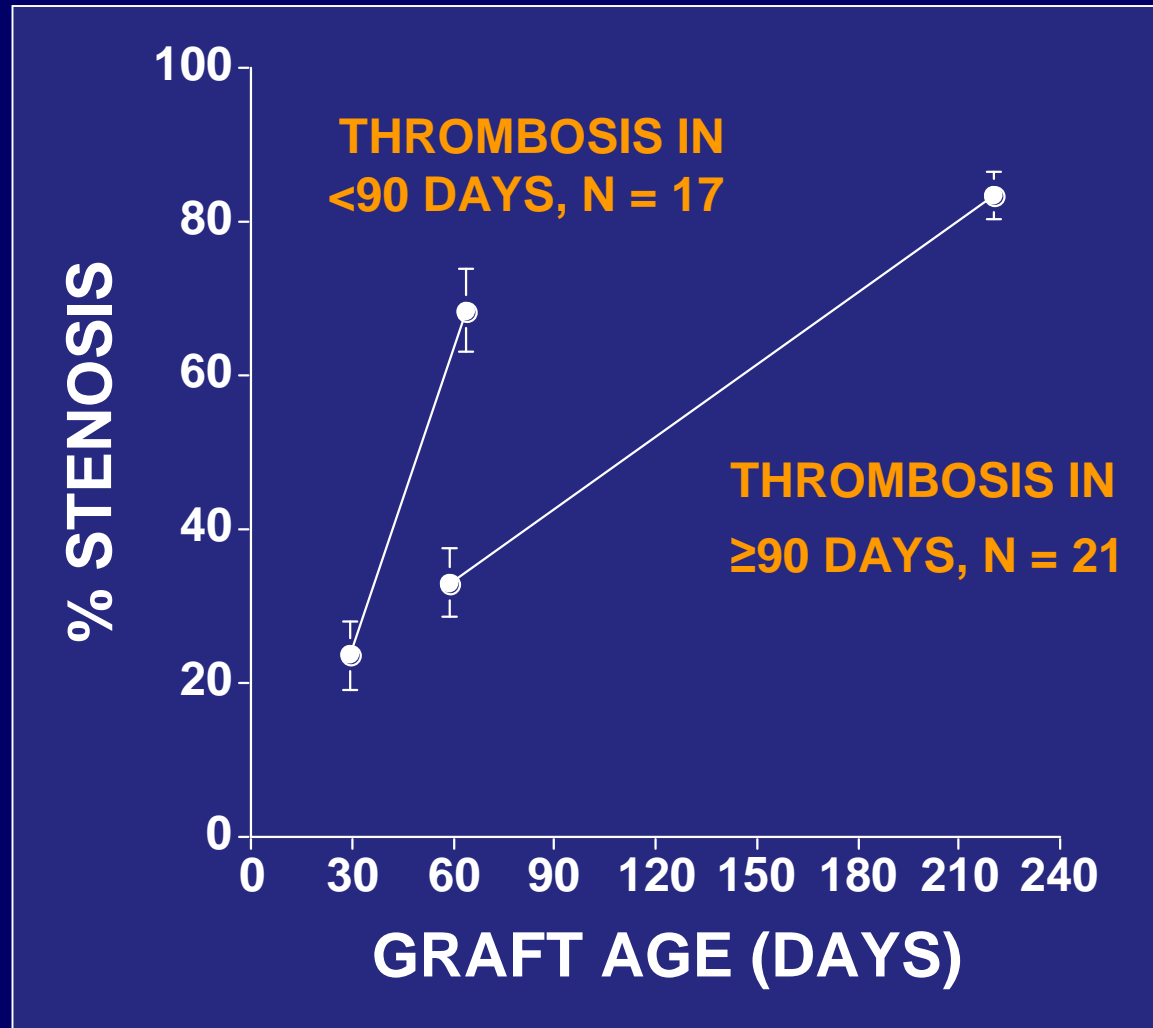
OUTLINE

- Q SURVEILLANCE PARADIGM
- RESULTS OF RCT'S
- **WHY ARE OUTCOMES DISAPPOINTING?**
 - LARGE HEMODYNAMIC VARIATION
 - Q SUDDENLY FALLS AS STENOSIS PROGRESSES
 - **INACCURATE PREDICTION OF THROMBOSIS**
- SURVEILLANCE: THE FALSE PARADIGM

Q DOES NOT ACCURATELY PREDICT THROMBOSIS



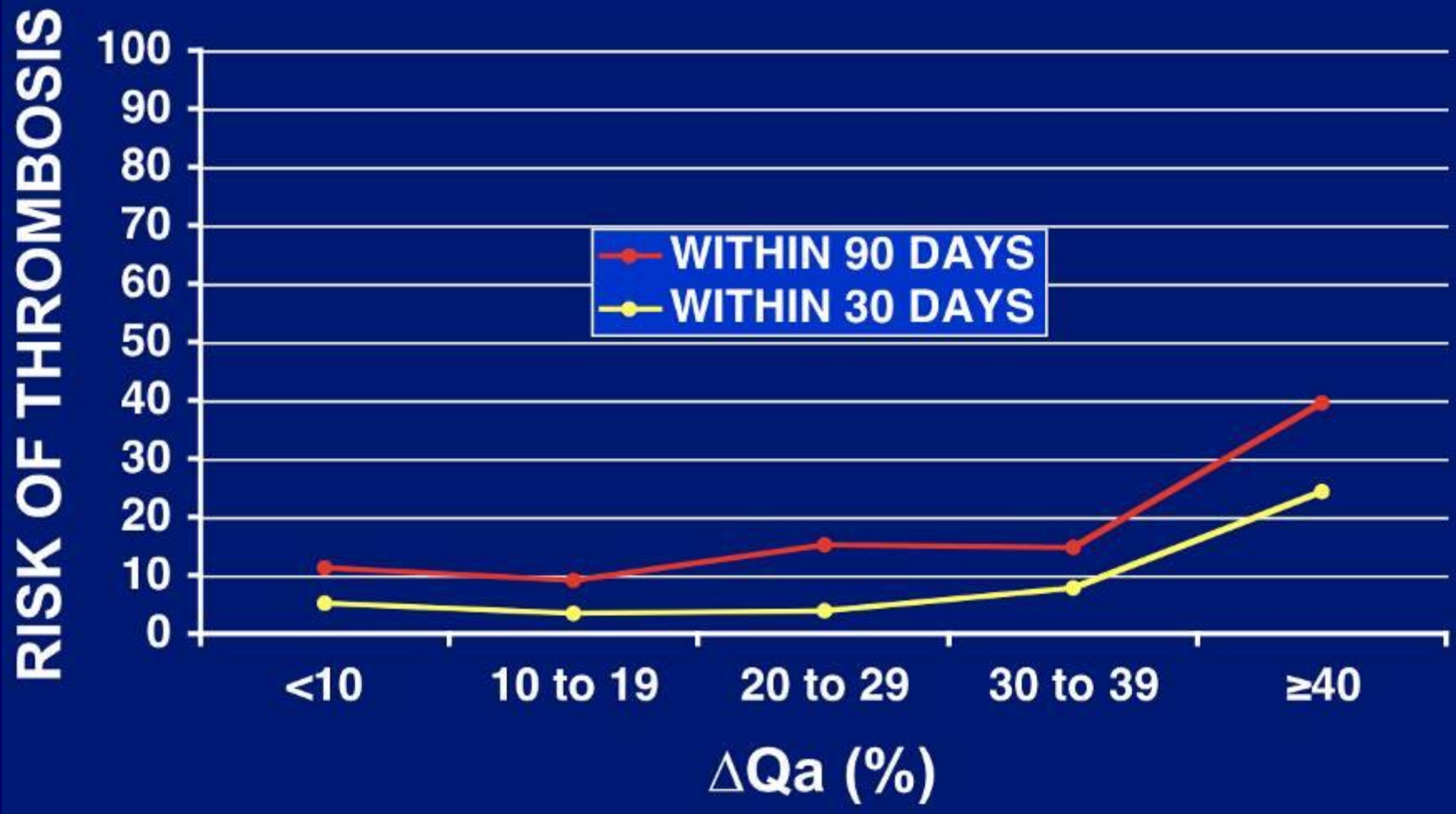
RAPID STENOSIS IN NEW GRAFTS CAUSES FAILURE OF SURVEILLANCE



Atray
ASN, 2001

LARGE DQ DOES NOT INDICATE HIGH RISK OF THROMBOSIS

LAST Q <1000 mL/min



SURVEILLANCE: THE FALSE PARADIGM

- **Q SURVEILLANCE DOES NOT PROLONG GRAFT LIFE OR REDUCE THROMBOSIS**
 - HEMODYNAMIC VARIATION IMPAIRS EFFECTIVENESS OF SURVEILLANCE
 - NARROW ARTERY HELPS EXPLAIN THROMBOSIS WITHOUT WARNING
- **BENEFIT OF SURVEILLANCE IN AVF'S NOT ESTABLISHED**
- **HIGH STANDARDS SHOULD BE APPLIED TO IMPORTANT RESEARCH QUESTIONS**
 - NONRANDOMIZED & SMALL SINGLE-CENTER RCT'S ARE HYPOTHESIS GENERATING
 - NEED LARGE MULTICENTER (DOUBLE-BLINDED) RCT'S TO ESTABLISH PARADIGMS

REVISED 2006 KDOQI GUIDLINES

Prospective surveillance of fistulae & grafts for hemodynamically significant stenosis, when combined with correction, ~~improves~~ patency & decreases incidence of thrombosis.

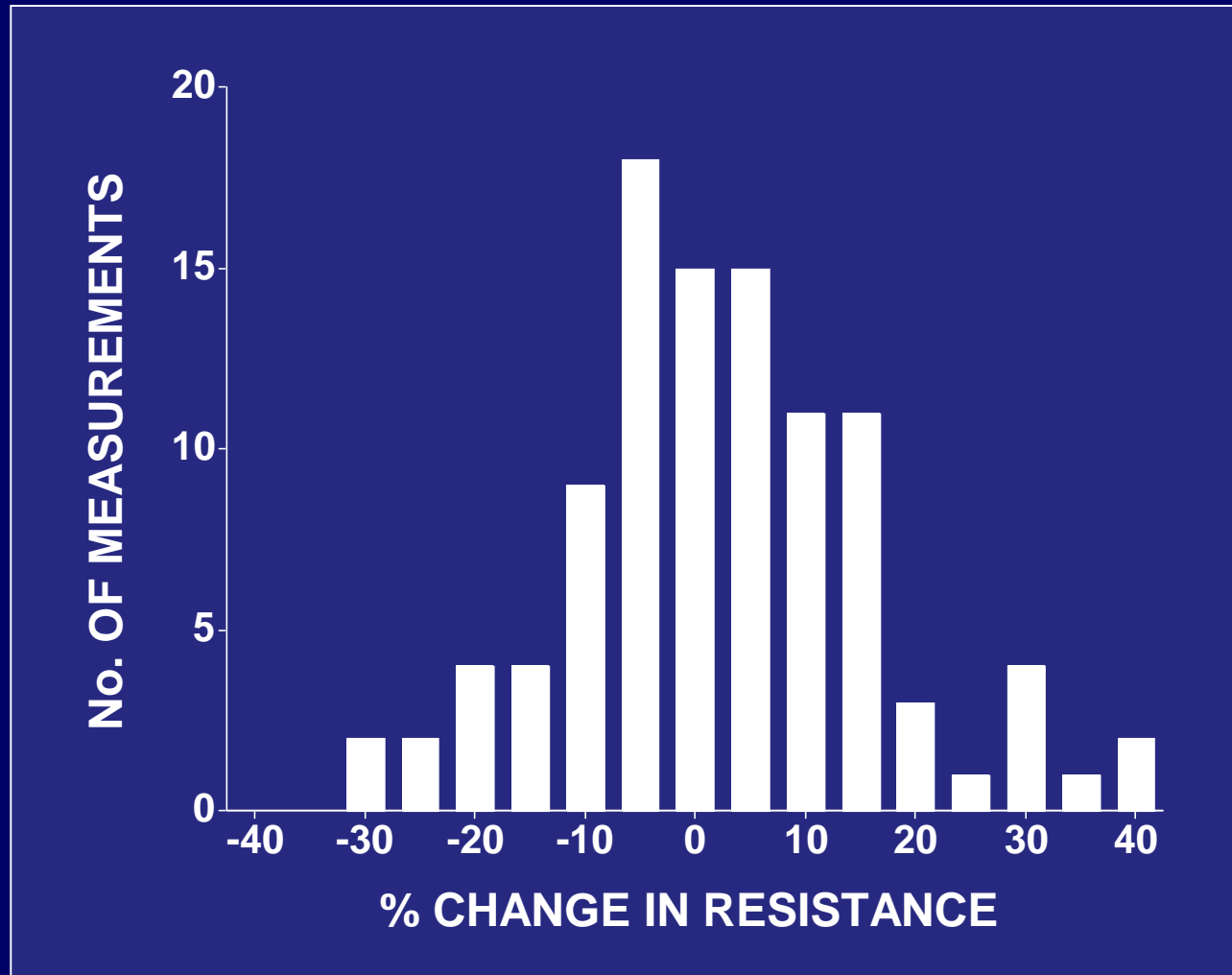
may improve

Until recently, it was widely accepted that hemodialysis synthetic grafts should undergo surveillance combined with intervention.

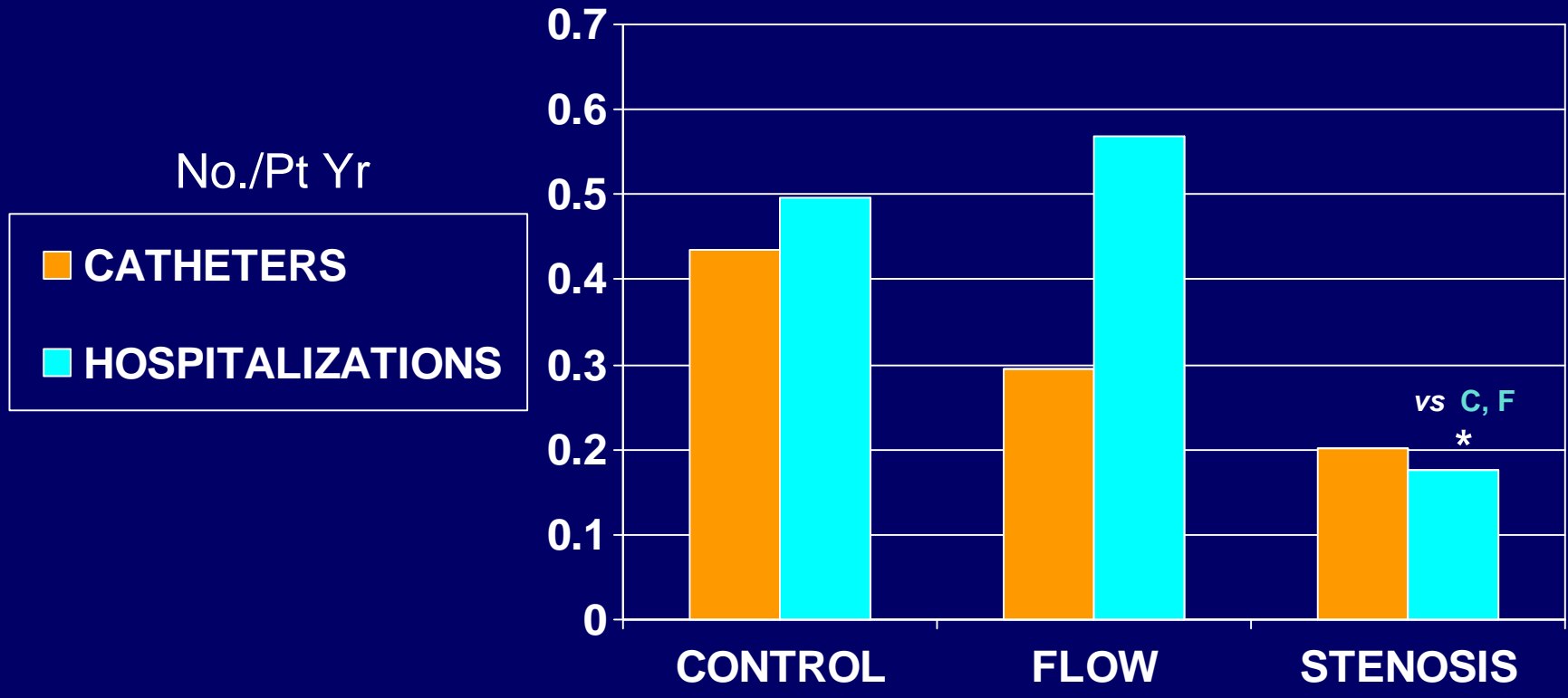
White, Clinical JASN, in press

CONCLUSION:
FLOW-RATE MONITORING IS USELESS

RESISTANCE VARIES DURING DIALYSIS



Q SURVEILLANCE DOES NOT REDUCE ADVERSE OUTCOMES



Dossabhoy, Sem Dial 2005