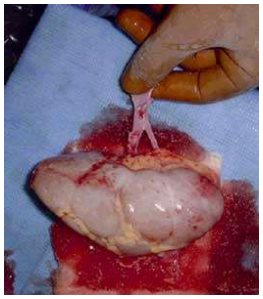
Jolanta Małyszko

Cardiovascular complications in Ktx



Dept Nephrology, Dialysis and Internal Medicine

Warsaw Medical University

Poland

Background

- Cardiovascular (CV) disease is the major cause of mortality and morbidity in CKD patients
- 50% of patients with CKD5 have some form of CVD
- CV mortality 5 x times higher in dialysis patients
- Survival from MI is lower in Dialysis patients
- There appears to be a significant reduction in CV mortality in transplant patients more recently (more risk with higher Age, DM, impaired graft function)

High Risk Features Are Prevalent in Dialysis Patients

• Age >60 yrs	1 in 5
• ESRD 2ndary to DM	1 in 4
• Diabetes Mellitus	1 in 2
• Hypertension	1 in 12
• Known CAD	1 in 5
• Duration of dialysis > 2 years	1 in 2

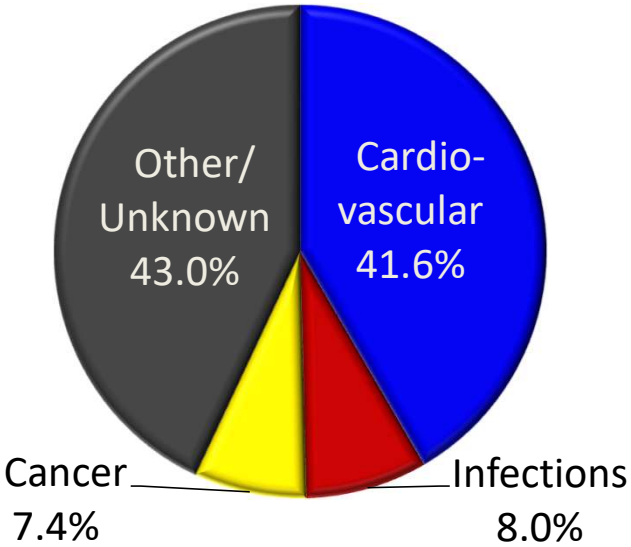
Lentine KL et al; J Am Soc Nephrol 2005; 16: 496-506

Some considerations

- Trend towards older patients getting renal transplant
- Diabetes mellitus
- Coronary calcification increases with dialysis vintage, thereby increasing atherosclerotic burden and making it more difficult to perform coronary revascularization
- Renal transplantation offers better quality of life and survival

Cardiovascular disease is responsible for >40% of mortalities in European dialysis population (ARO study)

Causes of death during 2-year study period



N=1678

de Francisco A et al. *Nephron Clin Pract* 2011;118:c143–c154

CV Assessment Factors: What are we worried about?

- Coronary Artery Disease
- LV function
- Pulmonary Hypertension
- Valvular Heart Disease
  - Aortic stenosis
  - Mitral regurgitation
- Arrhythmias
  - Atrial fibrillation
  - Ventricular Arrhythmias

Case vingnette

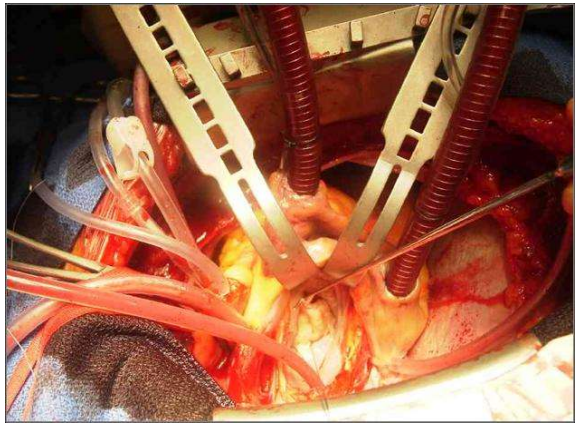
- patient JZ, ur 5.11.1952,
- Zawód - clerk
- Cause of ESRD
  - Glomerulonephritis (diagnosed without biopsy in 2000),
  - Creatinine at diagnosis over 3 mg/dL, proteinuria over 3 g/d hypertension

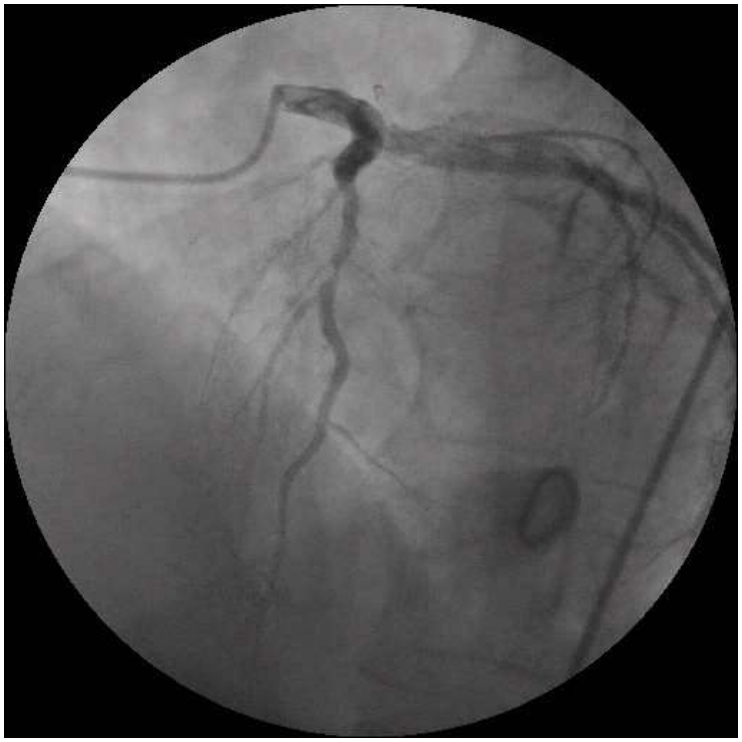
  HD 4.01.2012,
- KTx - 30.05.2013
  - 4 mismatches, (match only in)A and DR, PRA 0%,
  - At dischanrge creatinine 3.3 mg%,

  IS Tac, rapamune, prednisone
  - complications
    - PTDM
    - proteinuria
    - rapamune swithc to MMF (CellCept)
  - 2014 – glycemia normal

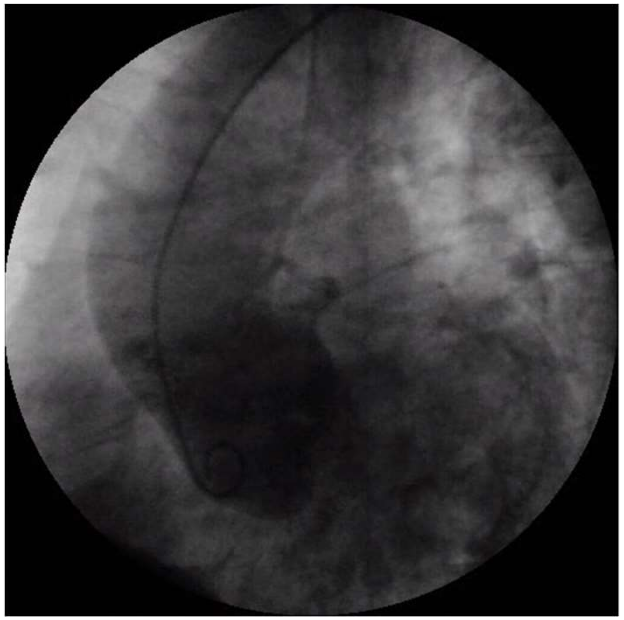
- First year further uneventful
- Proteinuria >100mg in spot urine
- Cardiac problems
- Severe aortic stenosis withy moderate aortic valve insufficiency
- Evaluation for cardiac surgery

- 2017 –sever aortic valve disorder,
  - CAD II class CCS,
  - Cardiac surgery
- 11.02.2018- coronarography
  - Creat before 2.0, after 1.58 mg/dL)
- 20.02.2018- mechanic valve and 2 bypasses LIMA-LAD

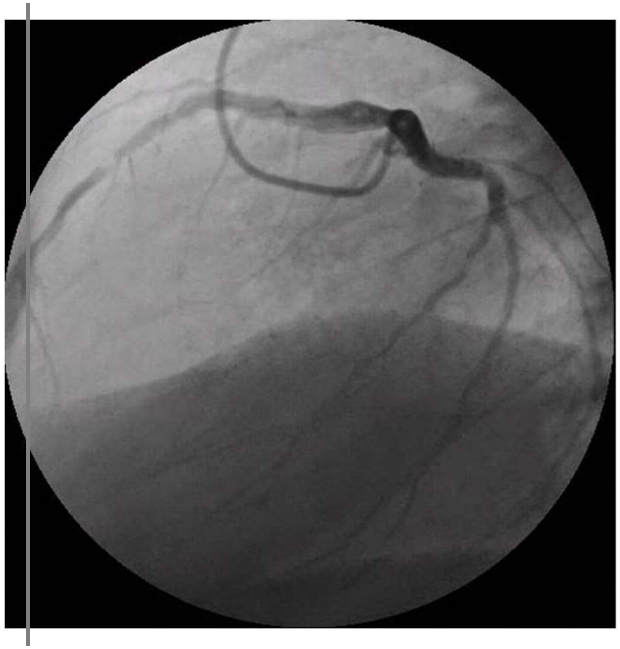




aortography



Coronarography- LAD



Coronarography righ coronary artery

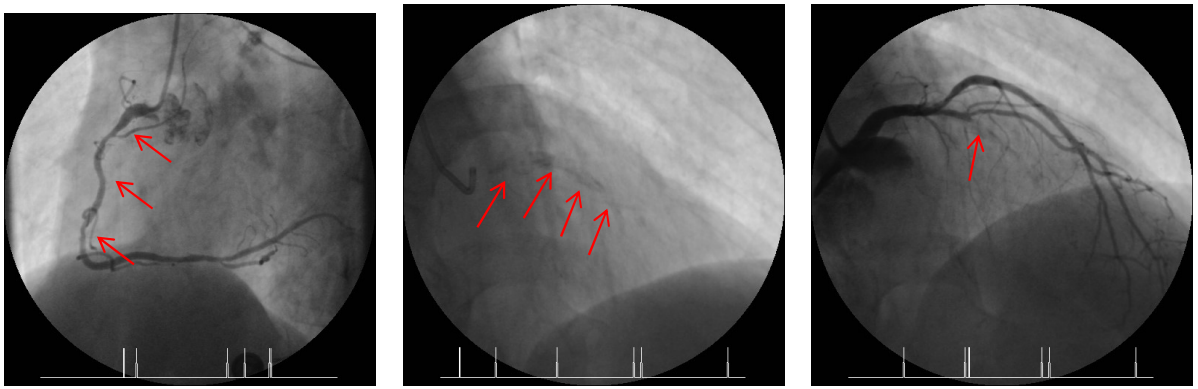
- On the 3rd day after surgery creatinine rise up to 5 mg/dl, decreased urine output,
- Steroids 3 x MP 500 mg iv, and HDF (cardiac surgery ICU) for 4 days,
- Clinical improvement, increased urin output, creatinine 2 mg/dL

- Further complications
  - penumonia,
  - Oral candidiasis,
  - Pleural effusion in lower and median lobe of the left lung
- Further therapy in the Department of Nephrology.
  - Removal of the acute catheter -Staph. hemolyticus (treated with vancomycin successfully)
  - Leucopenia after fluconazole,
  - Three times thoracocentesis (bloody fluid),
  - Creatinine fall to 1.4-1.6 mg/dl (03.2018)

Echocardiography 10 2018

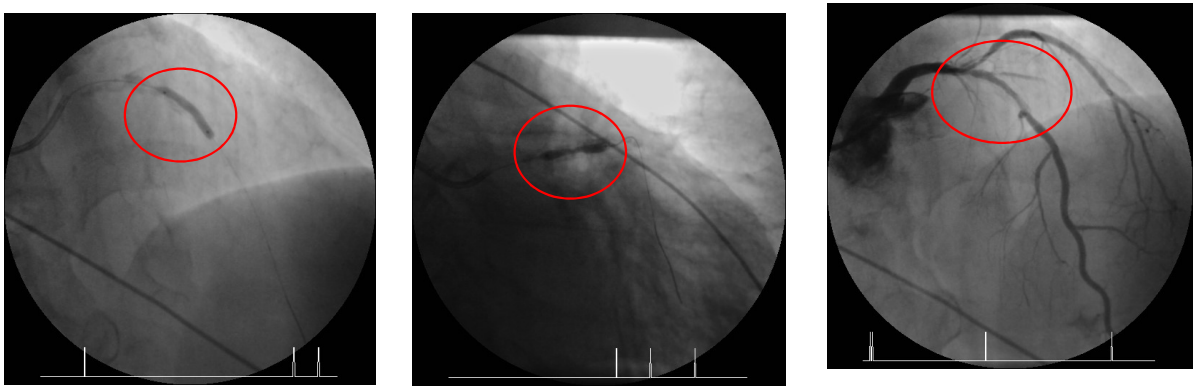
- Mechanic valve in the aortal ostium, with technical insufficiency, gradient max/mean 25/16. small fibrotic changes in mitral valve with normal movement. Small mitral and tricuspi insifficiency. No evident signs of endocarditis on valves in transthoracic echo.
- Cardiac cavities of normal volume and motility. EF 60%.
- Left ventricle thickness of upper normal range
- Relaxation impaired accordingly to age
- Inferior vena cava non dilated, with norma respiratatory movement.
- Systolic rressure in right ventricle normal
- Diameter of aorta and pulmonary trunk- normal.
- Pericardium- normal

Patient 54 years
STEMI anterior wall



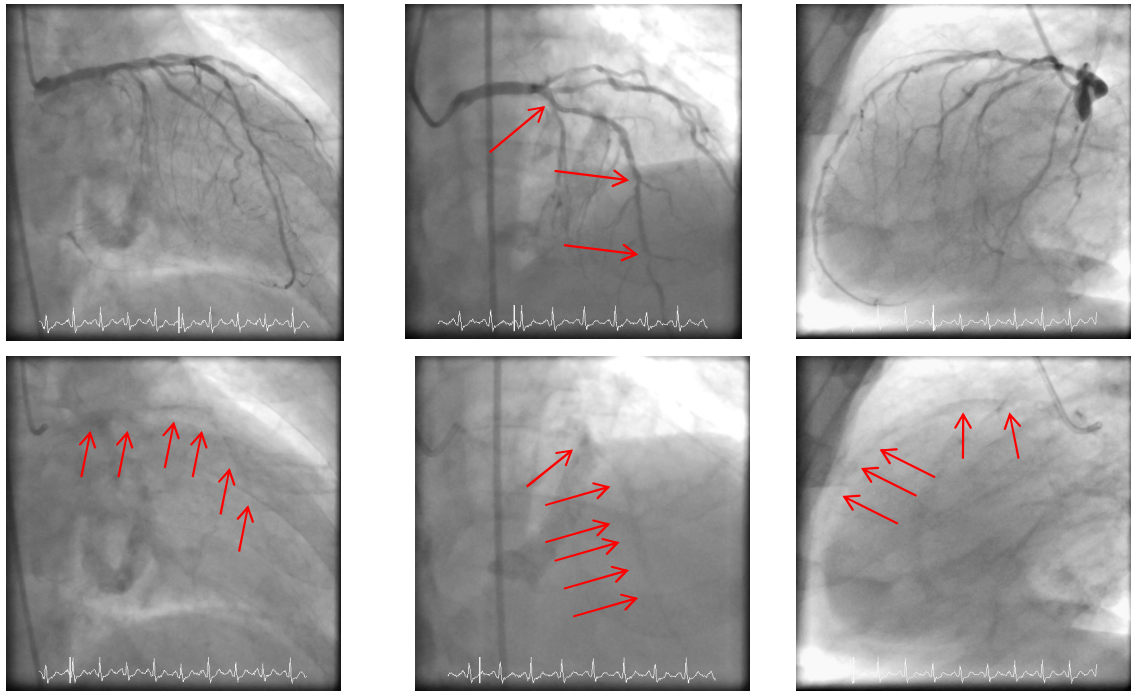
Primary angioplasty of right descending artery

Patient 54 years
STEMI anterior wall

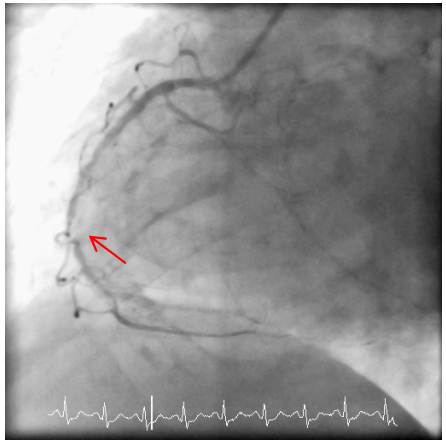


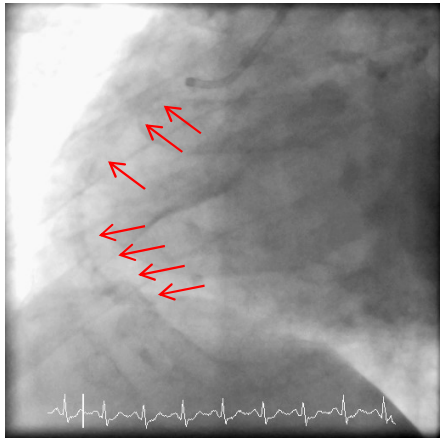
right descending artery- calcified plaque unsuccessful angioplasty –
Heart tram- cardiac surgery

patient 64 years
unstable CAD- cardiac surgery



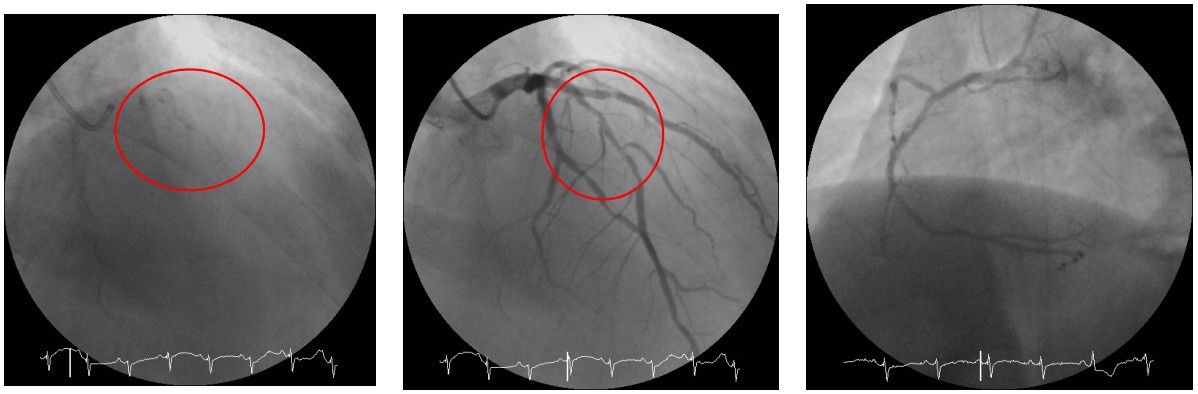
patient 64 years
unstable CAD- cardiac surgery





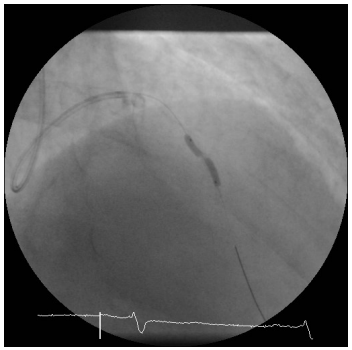
Cardiac surgery

Patient 65 years
NSTEMI anterior wall

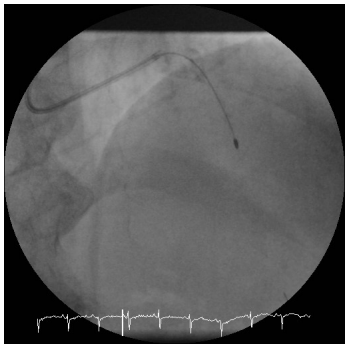


Primary angioplasty of left descending artery

Patient 65 years
NSTEMI anterior wall



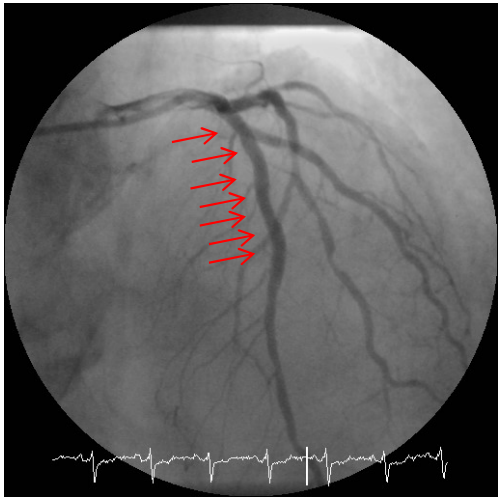
predilation
„hourglass image"



Rotablation
atherectomy

DES
implantation

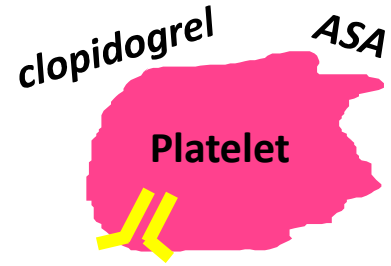
Patient 65 years
NSTEMI anterior wall



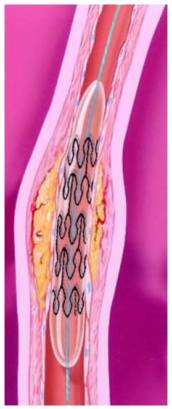
Final effect of PCI – successful implantation

PCI evolution

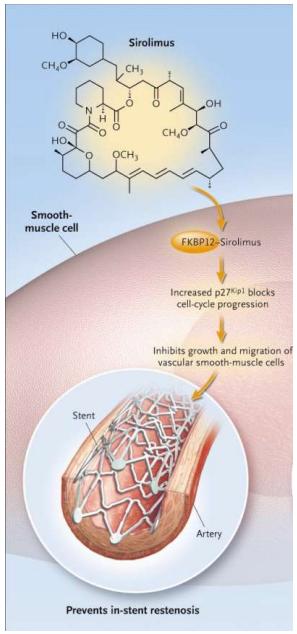
POBA



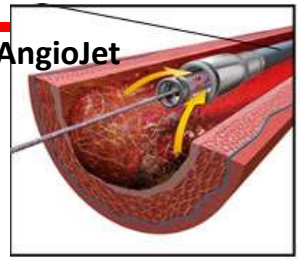
Antiplatelet drugs



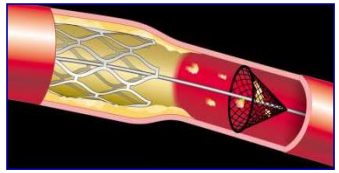
Stents



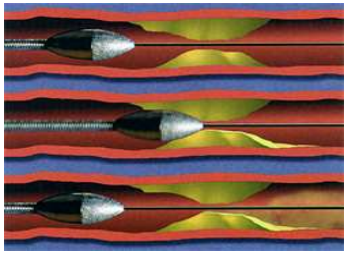
DES



Evacuation of distal thrombus

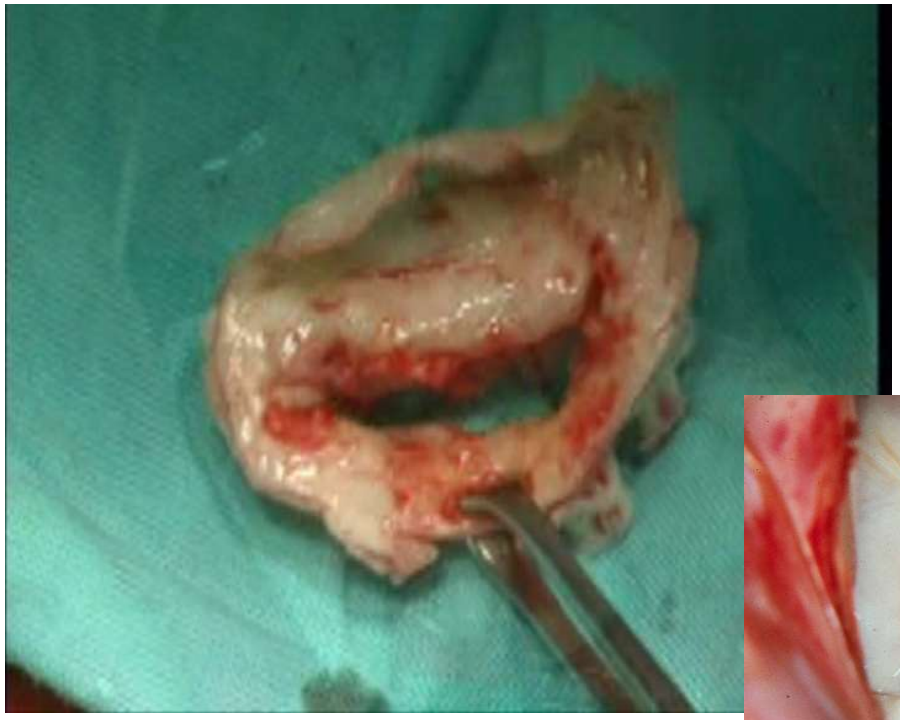


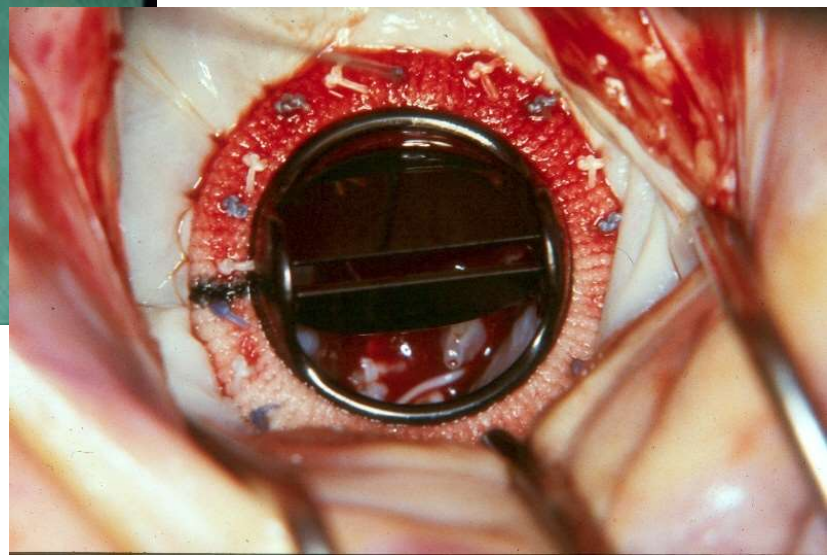
Thrombus aspiration, distal protection

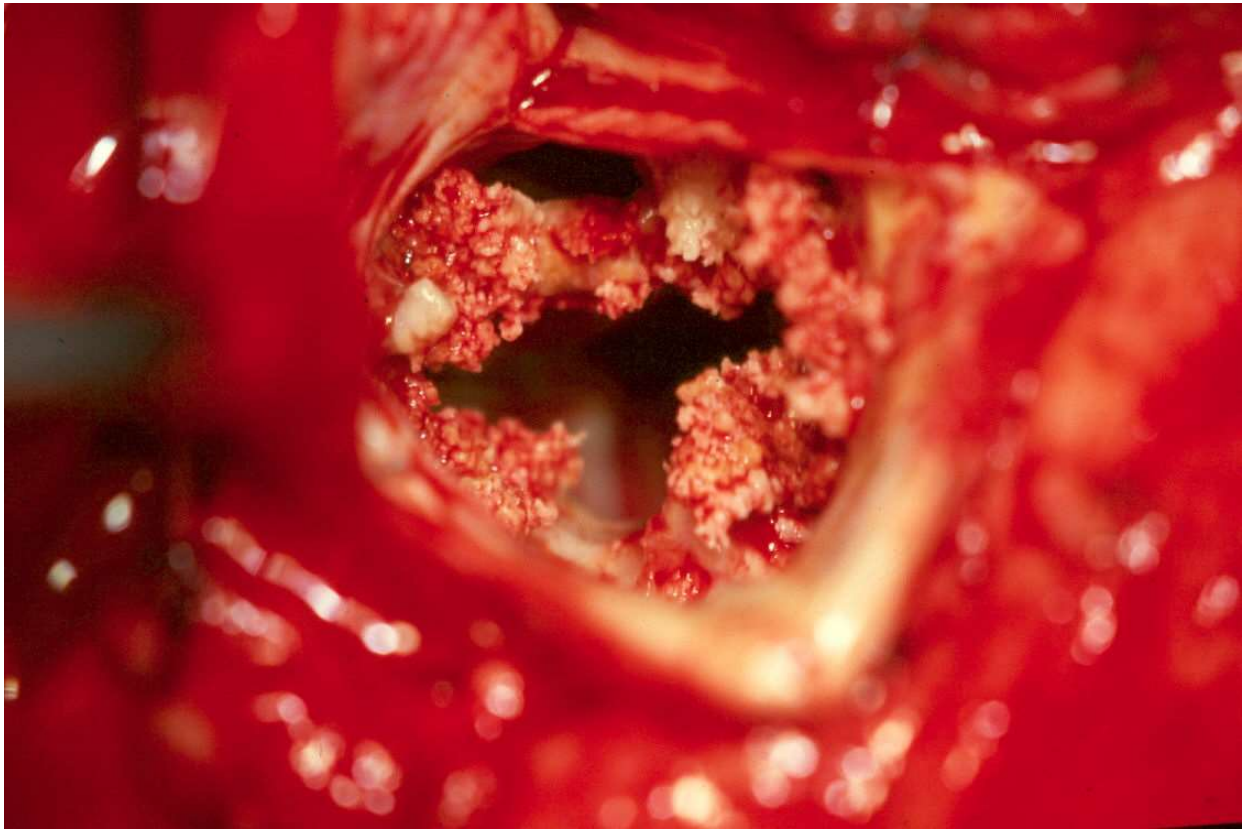


Rotablation

We cannot repair everything







Medical Therapy

- Mostly follows along the same lines as non-dialysis population
- Weigh risk of bleeding
- Dose adjustment of medications
- Statins: continue if already on them
  - Useful in the transplant population

Incidence and Predictors of Myocardial Infarction after Kidney Transplantation

Krista L. Lentine,* Daniel C. Brennan,† and Mark A. Schnitzler*

J Am Soc Nephrol 16: 496-506, 2005. doi: 10.1681/ASN.2004070580

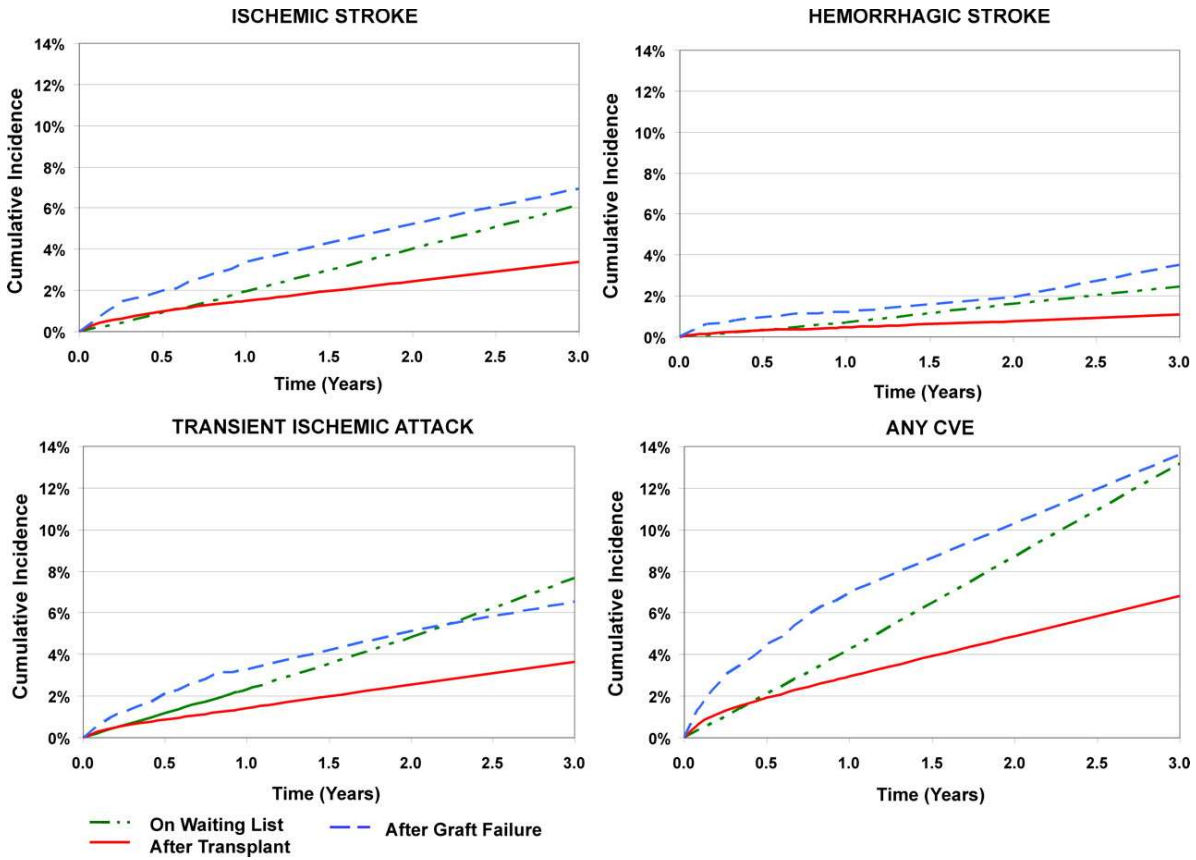
Among 35,847 eligible participants, the cumulative incidence of PTMI was 4.3% (95% confidence interval [CI], 4.1 to 4.5%), 5.6% (95% CI, 5.3 to 5.8%), and 11.1% (95% CI, 10.7 to 11.5%) at 6, 12, and 36 mo, respectively. Risk factors for PTMI included older recipient age, pretransplantation comorbidities (diabetes, angina, peripheral vascular disease, and MI), transplantation from older donors and deceased donors, and delayed graft function. Women, blacks, Hispanics, and employed recipients experienced reduced risk. The hazard of PTMI rose after a diagnosis of posttransplantation diabetes (HR, 1.60; 95% CI, 1.35 to 1.88) and markedly increased after graft failure (HR, 2.78; 95% CI, 2.41 to 3.19). In separate analyses, PTMI predicted death-censored graft failure (HR, 1.89; 95% CI, 1.63 to 2.20) and strongly predicted death in a manner that declined with time after PTMI.

Variations in the Risk for Cerebrovascular Events after Kidney Transplant Compared with Experience on the Waiting List and after Graft Failure

Krista L. Lentine,*† Lisa A. Rocca Rey,*‡ Swathy Kolli,* Giuliana Bacchi,*§
Mark A. Schnitzler,* Kevin C. Abbott,‖ Huiling Xiao,* and Daniel C. Brennan¶

Clin J Am Soc Nephrol 3: 1090–1101, 2008. doi: 10.2215/CJN.03080707

Observed incidence of new-onset cerebrovascular events on the kidney transplant waiting list, after transplantation, and after allograft failure.



Krista L. Lentine et al. CJASN 2008;3:1090-1101

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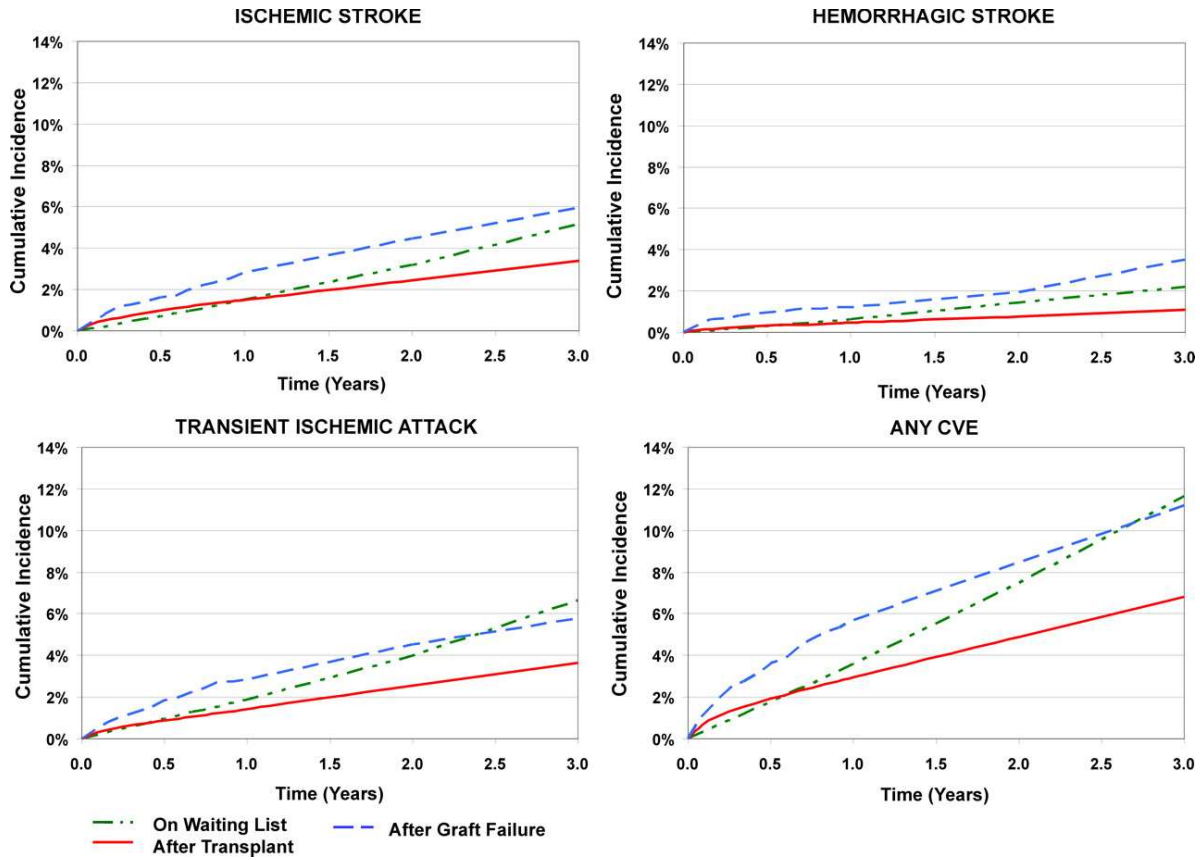
CJASN

Incidence of new-onset cerebrovascular events by kidney transplant status, with adjustment to the average characteristics of the study sample that underwent transplantation.



Krista L. Lentine et al. CJASN 2008;3:1090-1101

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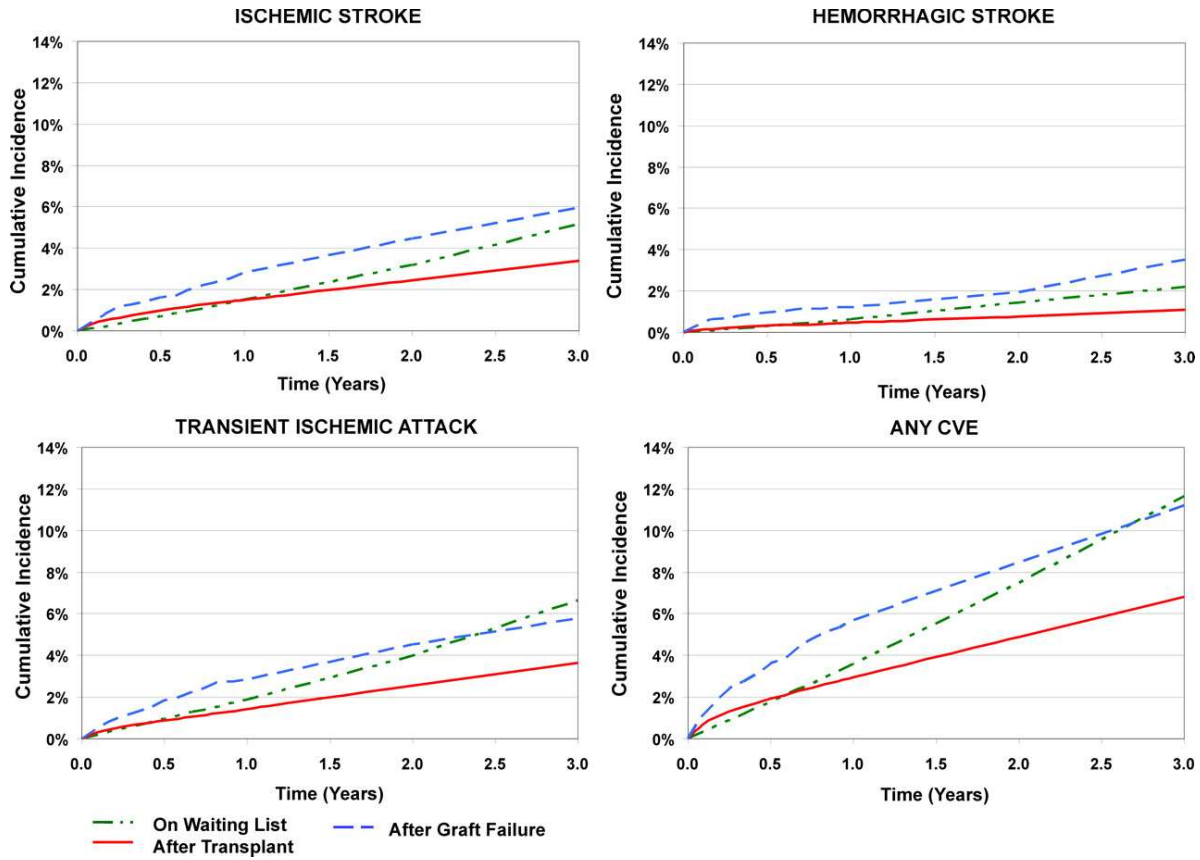

Krista L. Lentine et al. CJASN 2008;3:1090-1101

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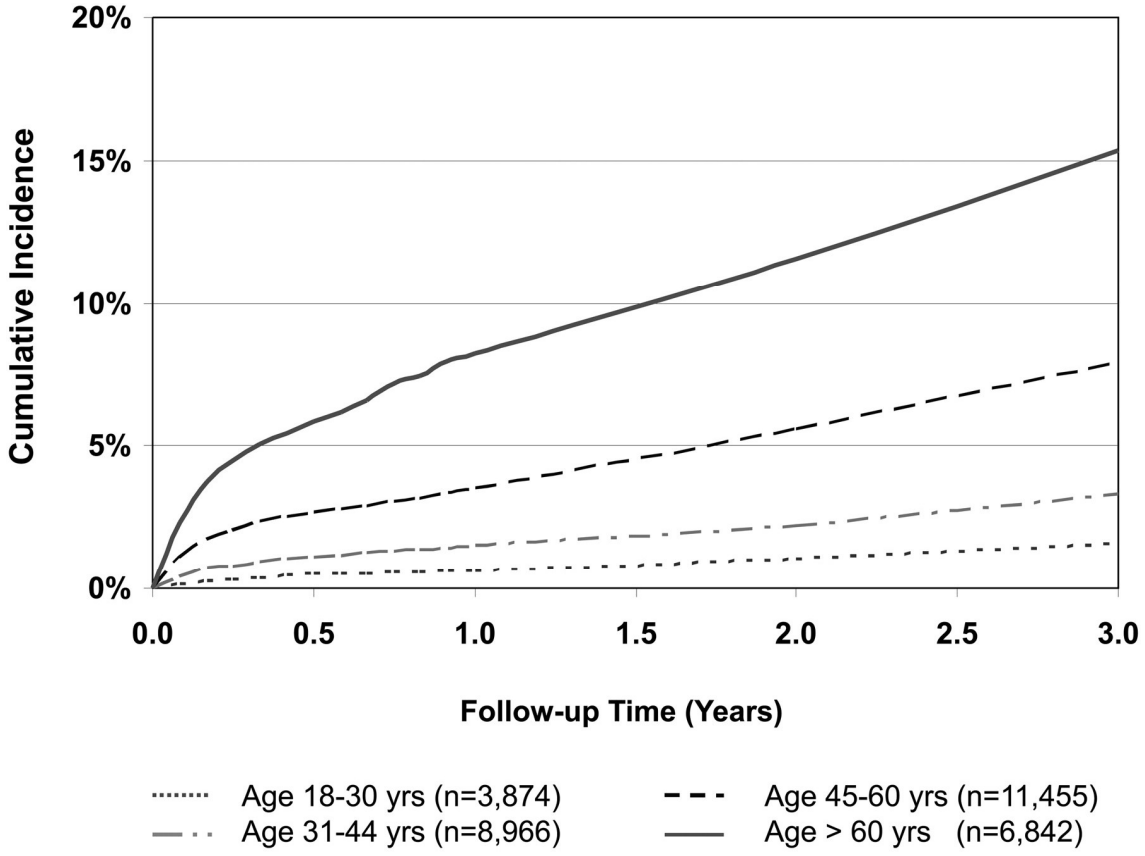
CJASN

Incidence, Predictors, and Associated Outcomes of Atrial Fibrillation after Kidney Transplantation

Krista L. Lentine,*† Mark A. Schnitzler,* Kevin C. Abbott,‡ Leiming Li,* Huiling Xiao,* Thomas E. Burroughs,* Steven K. Takemoto,* Lisa M. Willoughby,* Jeffrey A. Gavard,* and Daniel C. Brennan§

Clin J Am Soc Nephrol 1: 288–296, 2006. doi: 10.2215/CJN.00920805

Cumulative incidence of new-onset AF after transplantation, stratified by recipient age at transplantation.



Krista L. Lentine et al. CJASN 2006;1:288-296

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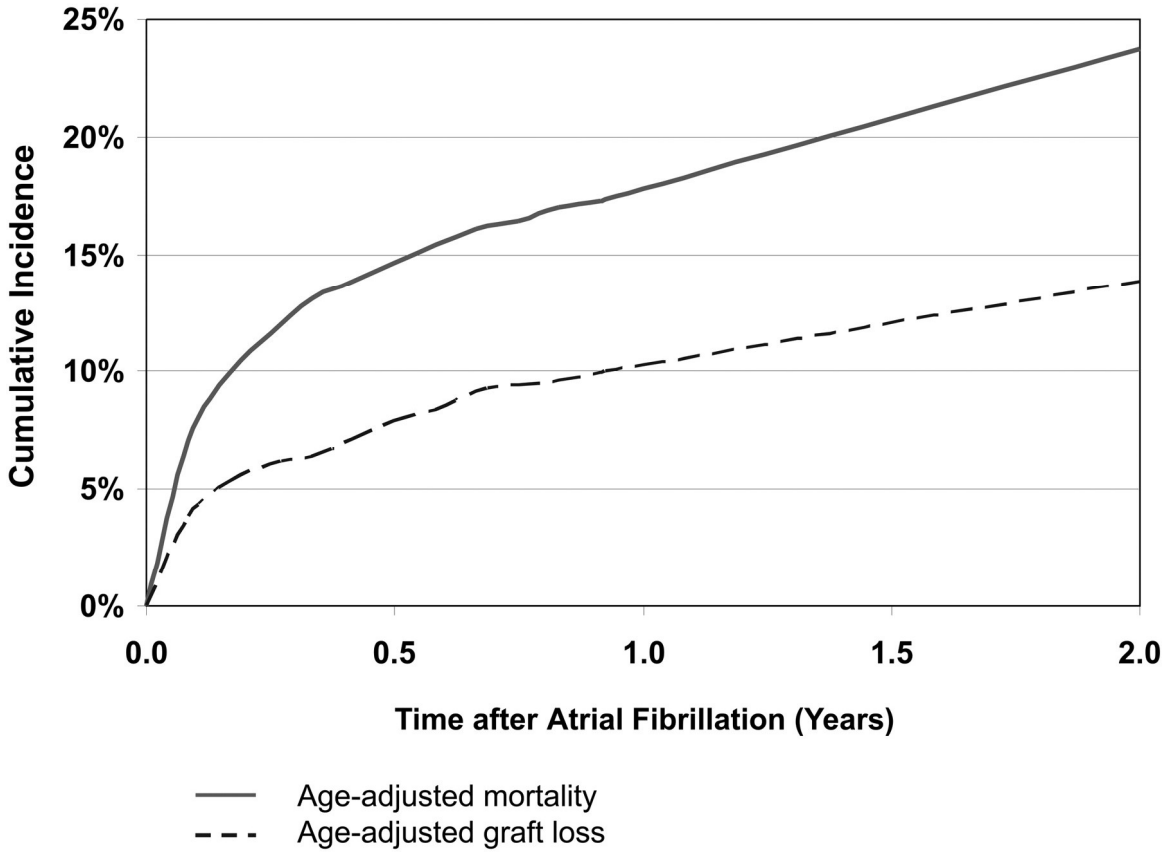
CJASN

Time course of age-adjusted mortality and death-censored graft loss after diagnosis of new-onset AF after kidney transplantation.



Krista L. Lentine et al. CJASN 2006;1:288-296

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CJASN

Among 31,136 eligible transplant recipients, the cumulative incidence of new-onset AF was 3.6% (95% CI 3.4 to 3.8%) and 7.3% (95% CI 7.0 to 7.6%) at 12 and 36 mo and declined below the demographics-adjusted cumulative incidence on the waiting list by approximately 17 mo. Risk factors for posttransplantation AF included older recipient age, male gender, white race, renal failure from hypertension, and coronary artery disease. Extended pretransplantation dialysis duration, posttransplantation diabetes, and graft failure were identified as potentially modifiable correlates of AF. In separate analyses, AF independently predicted death (AHR 3.2; 95% CI 2.9 to 3.6) and death-censored graft loss (AHR 1.9; 95% CI 1.6 to 2.3)

Transpl Int. 2013 November ; 26(11): . doi:10.1111/tri.12168.

Multivessel coronary revascularization and outcomes in kidney transplant recipients

Colin R. Lenihan, **Maria E. Montez-Rath**, **Wolfgang C. Winkelmayer**, and **Tara I. Chang**
Division of Nephrology, Department of Medicine, Stanford University School of Medicine, Palo Alto, CA

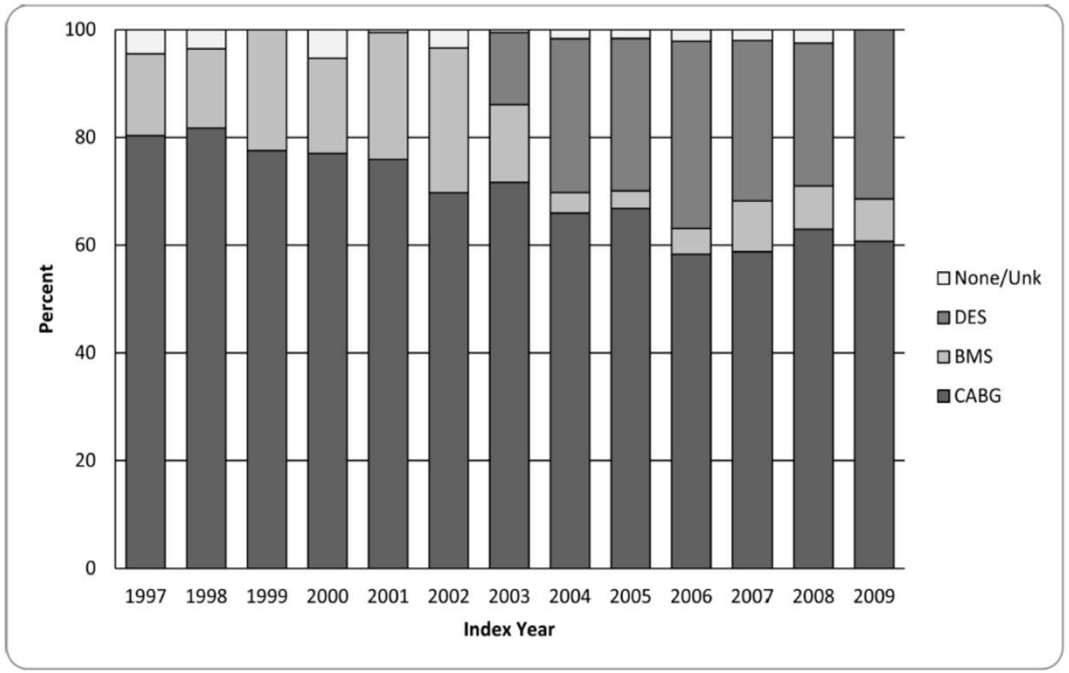

Figure 2.
Distribution of revascularization method by index year
Abbreviations: Unk = unknown; DES = drug eluting stent; BMS = bare metal stent; CABG = coronary artery bypass grafting

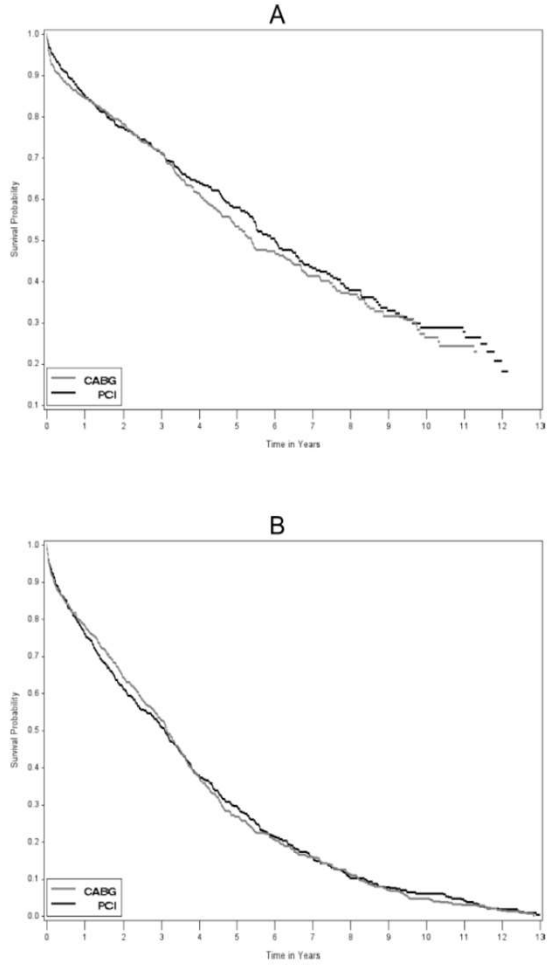

Figure 3.
Survival curves for the propensity score-matched cohort for (A) death and (B) the composite of death or MI.
Log-rank tests yielded p=0.48 for the outcome of death (A) and p=0.79 for the outcome of death or MI (B).

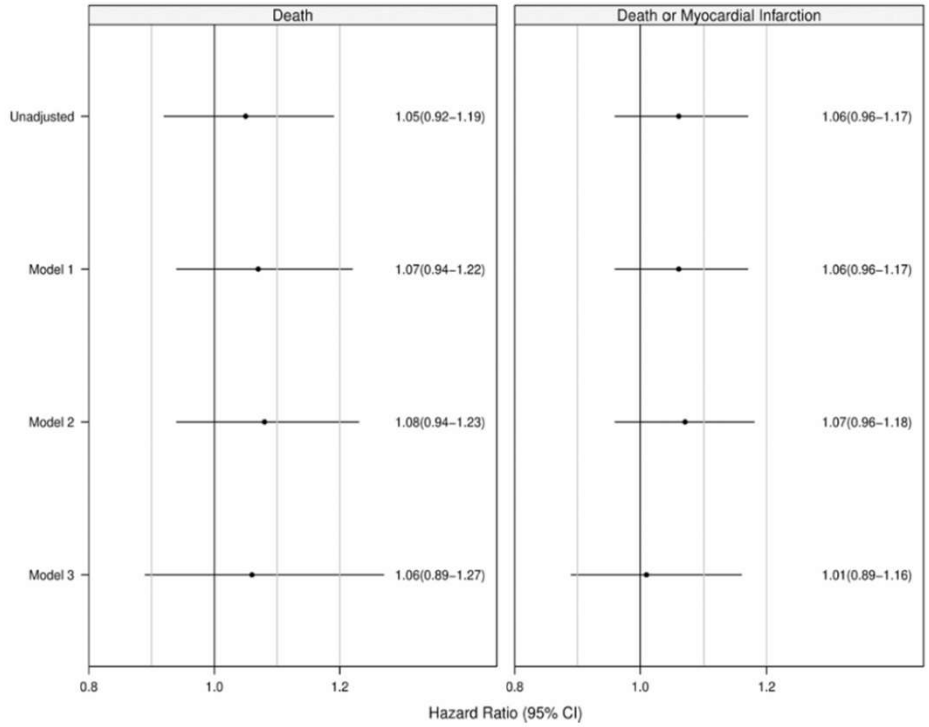

Figure 4.

Unadjusted and adjusted hazard ratios for coronary artery bypass grafting compared with percutaneous coronary intervention (referent).for the outcomes of (A) death or (B) death or myocardial infarction

Model 1: Adjusted for age, sex, race

Model 2: Model 1 + adjustment for cause of ESRD, total years with ESRD, years with current transplant, transplant type, preemptive current transplant, previous failed transplant, skilled nursing facility utilization, hospital days, non-nephrology clinic visits, index myocardial infarction, and comorbid conditions: myocardial infarction, cerebrovascular disease valve disease, heart failure, peripheral vascular disease, diabetes mellitus, hypertension, alcohol, tobacco, cancer, chronic pulmonary disease

Model 3: Propensity score-matched cohort

Conclusions

- Cardiovascular disease is very prevalent in Ktx
- Work-up is not straightforward.
- Choice of risk stratification of any single patient should be individualized
- Unstable angina, MI, Moderate to severe Aortic stenosis and severe LV dysfunction are high risk features
- Consider an echocardiogram in all patients being considered for renal transplant and in Ktx
- Stress testing is the most common form of further stratification (DSE)
- If stress test is moderately or highly abnormal, coronary angiography should be recommended
- Percutaneous coronary interventions becoming safer and more effective and trend likely to continue
- Special challenges remain in Ktx

- *We Need to Be Good Clinicians at the Bedside First !*

- *Modern technology is not always available to us*

- *It takes longer to use history, physical exam skills AND technology…*

However, beautiful is the strategy,

you should occasionally look at the results

Winston Churchill