Proteinuria and Hematuria

Indicators of chronic kidney disease

ผศ.นพ.ชลธิป พงศ์สกุล

ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น

Proteinuria and hematuria

- Indicators of kidney damage
- Persistent more than 3 months: CKD
- Need investigation and treatment
  - Stop kidney damage
  - Slow progression of CKD

proteinuria

- 0.5-10% of normal population
- Benign isolated proteinuria
  - Idiopathic persistent proteinuria
  - Functional proteinuria
  - Postural proteinuria
- Need investigation in persistent proteinuria

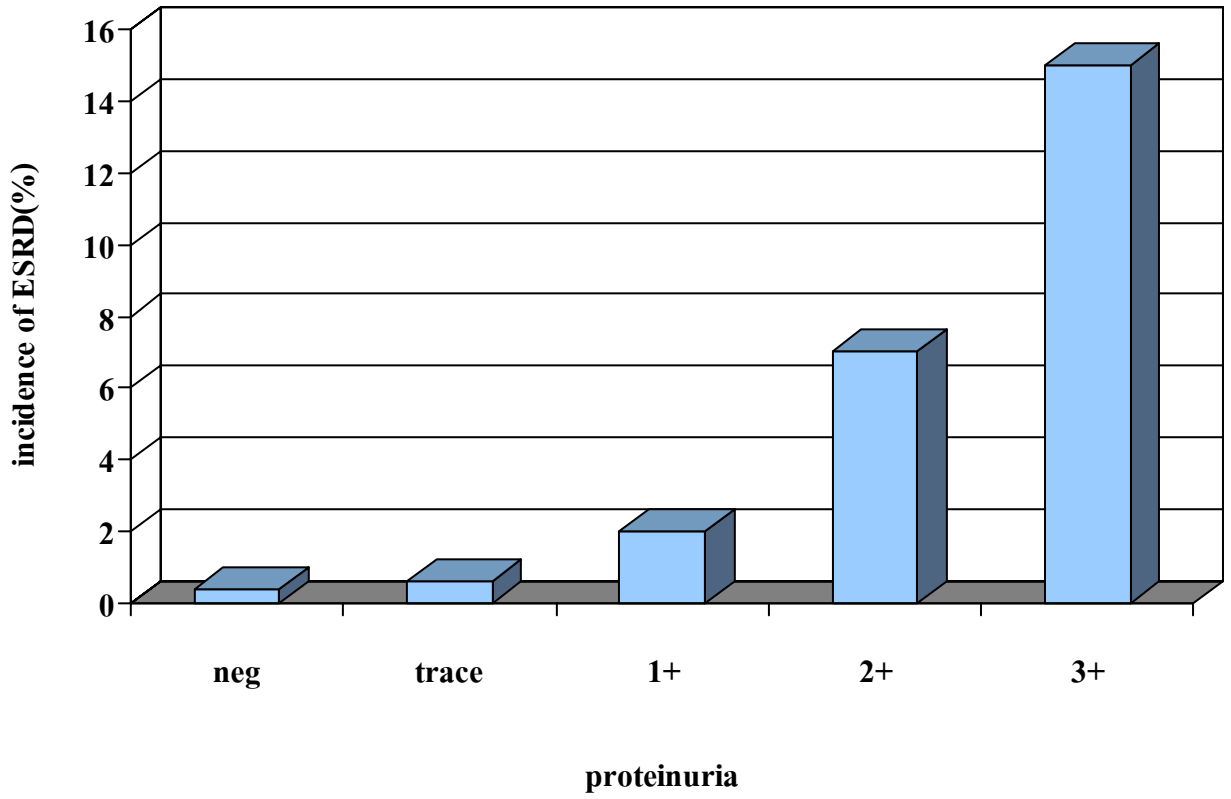
hematuria

- Gross hematuria
  - Pathology in urinary tract
  - Need immediate evaluation
- Asymptomatic microscopic hematuria
  - Transient: follow heavy exercise, infection
  - Persistent: sign of glomerulonephritis, tumor

Proteinuria

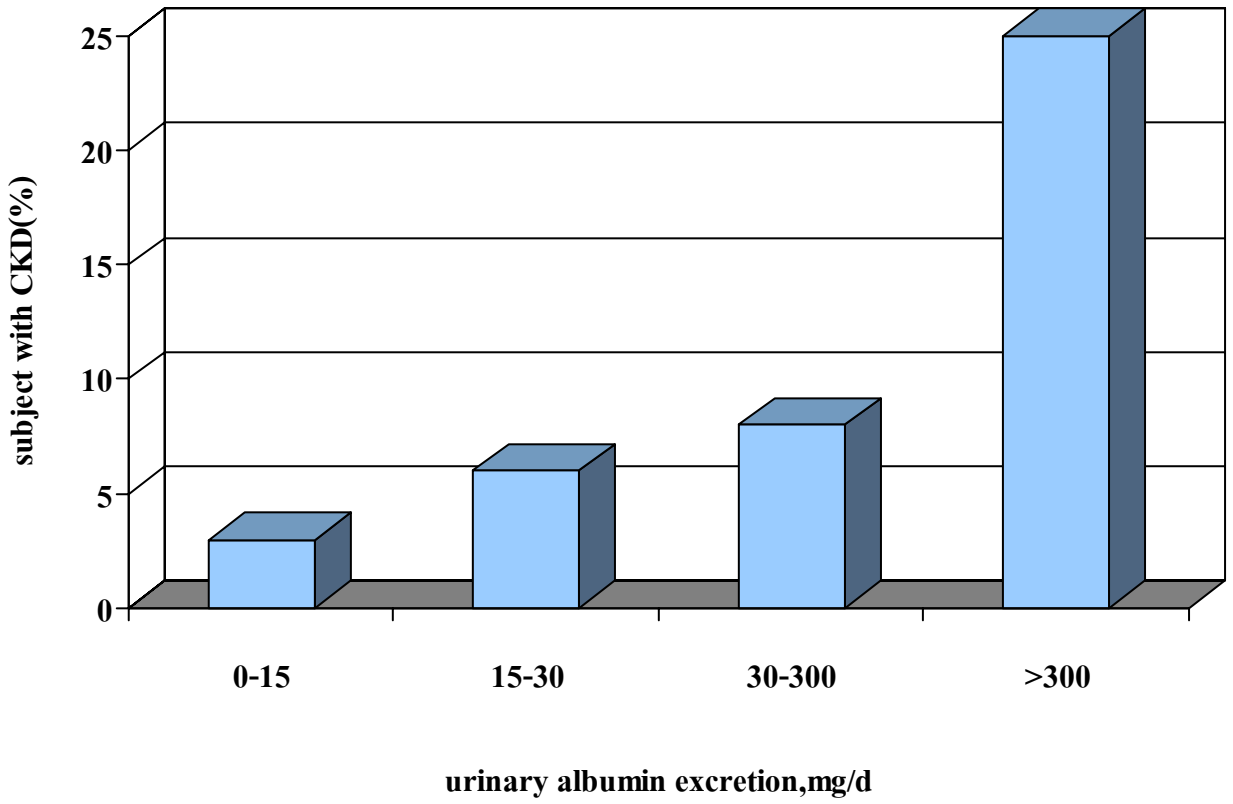
- Macroalbuminuria
  - Albuminuria > 300 mg/day
  - Detect by urine dip stick
  - Spot urine protein/Cr>200 mg/gm
- Microalbuminuria
  - Albuminuria less than dip stick sensitivity
  - Albuminuria 30-300 mg/day
  - Albumin excretion rate 20-200 ug/min

Proteinuria as risk of ESRD after 17 years follow up



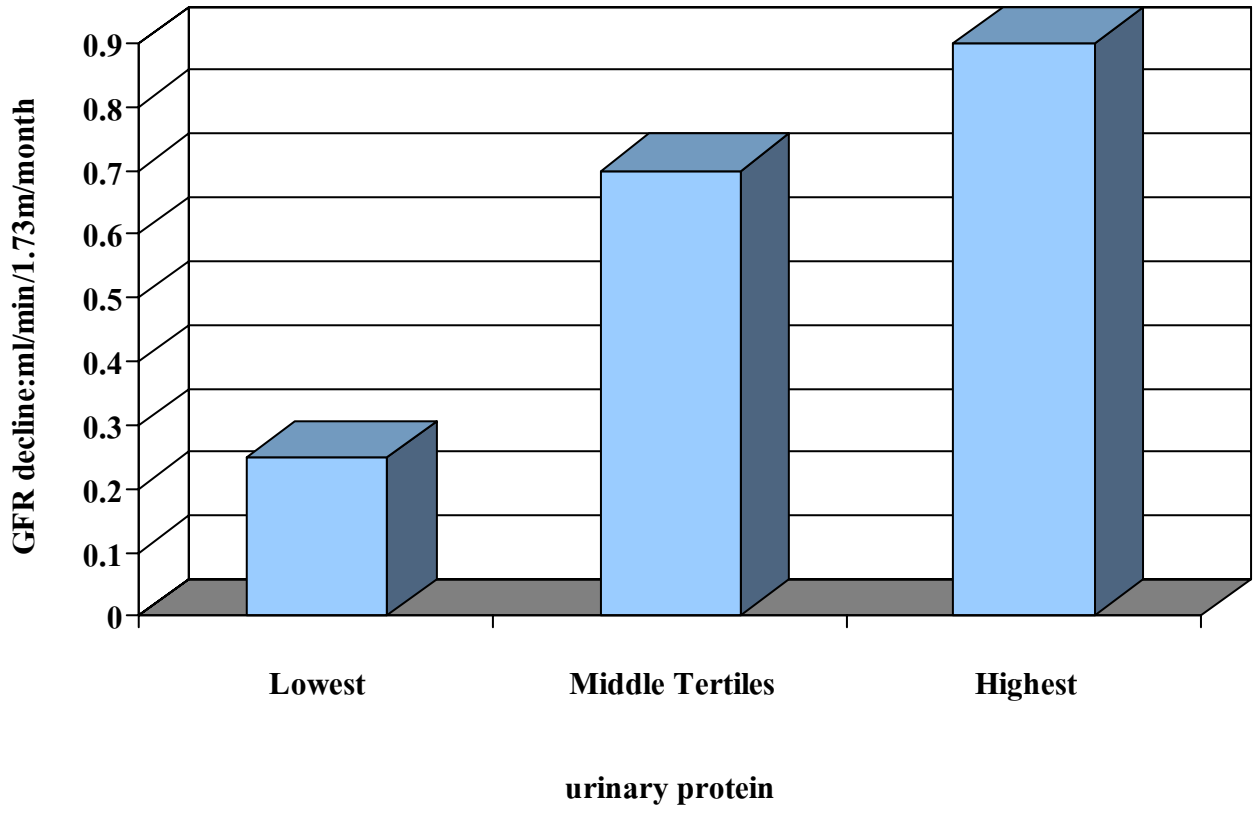
Kidney Int;63:2003;1468-1474

New stage 3 CKD and albuminuria after 4.2 years follow up



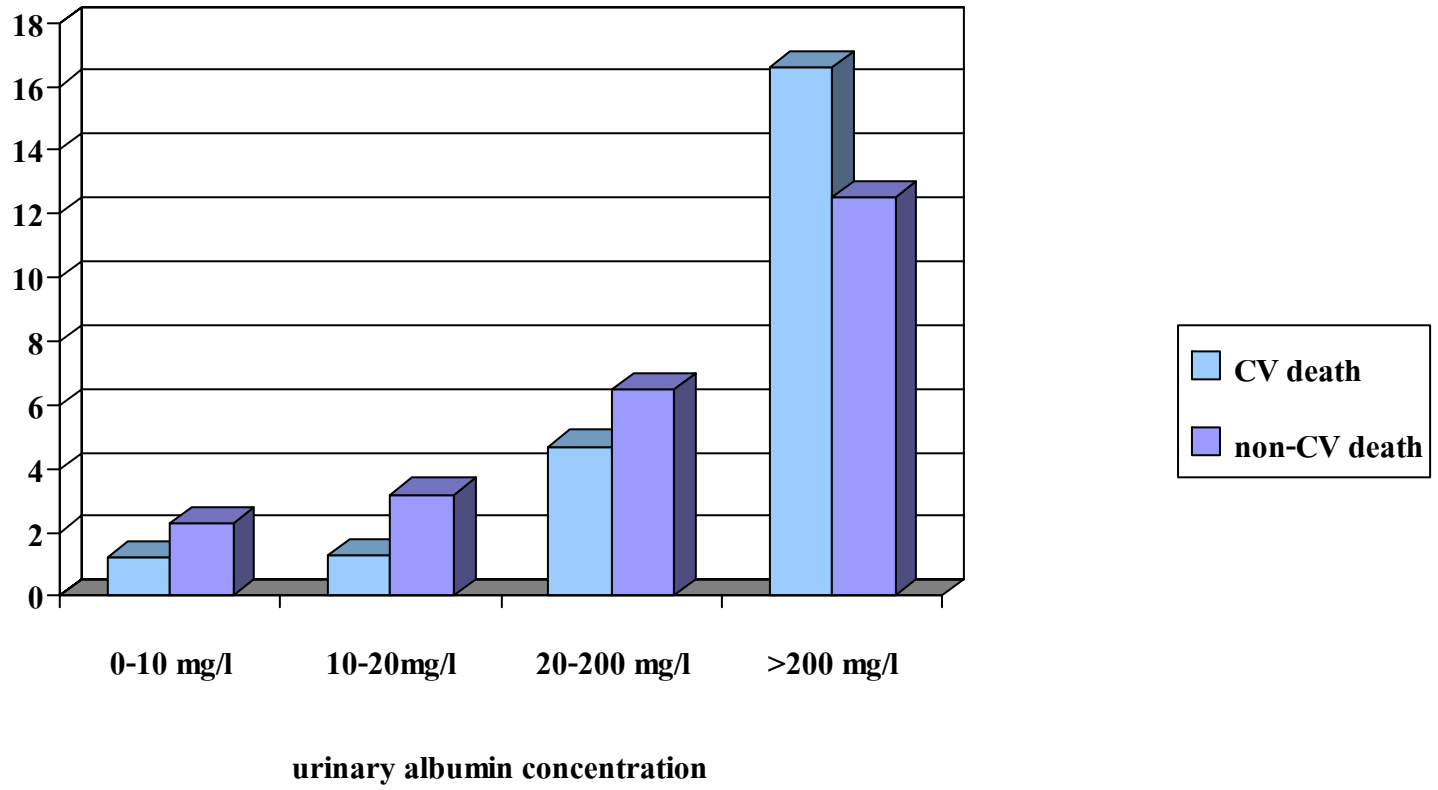
Kidney Int;92:2004;s18-s21

Rate of GFR decline per tertile of urinary protein excretion rate

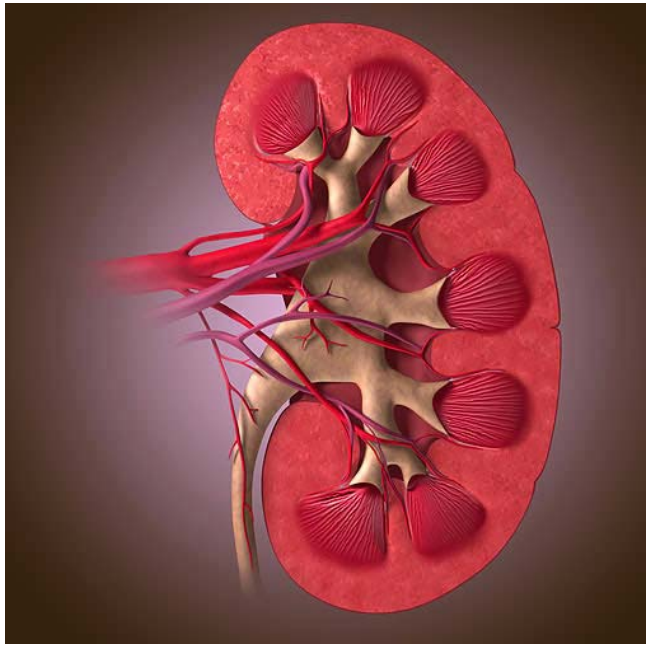


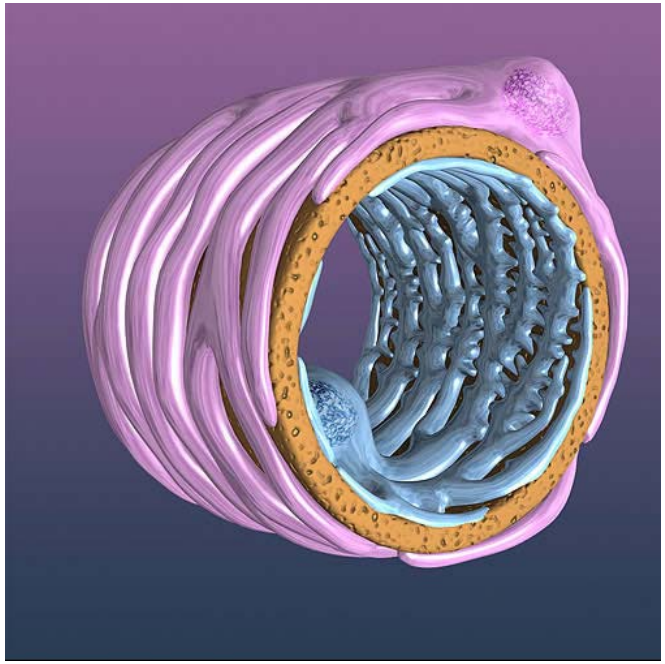
Kidney Int;52:1997;s54-s57

Incidence rate per 100 person-years and urinary albumin concentration

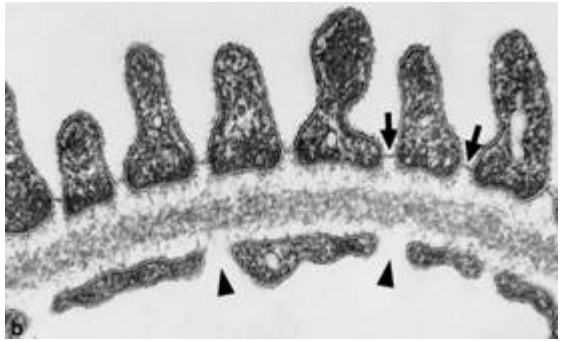


Circulation.;106:2002;1777-1782





Endothelial injury
Inflammation
Tubulointerstitial injury
fibrosis



How to detect microalbuminuria

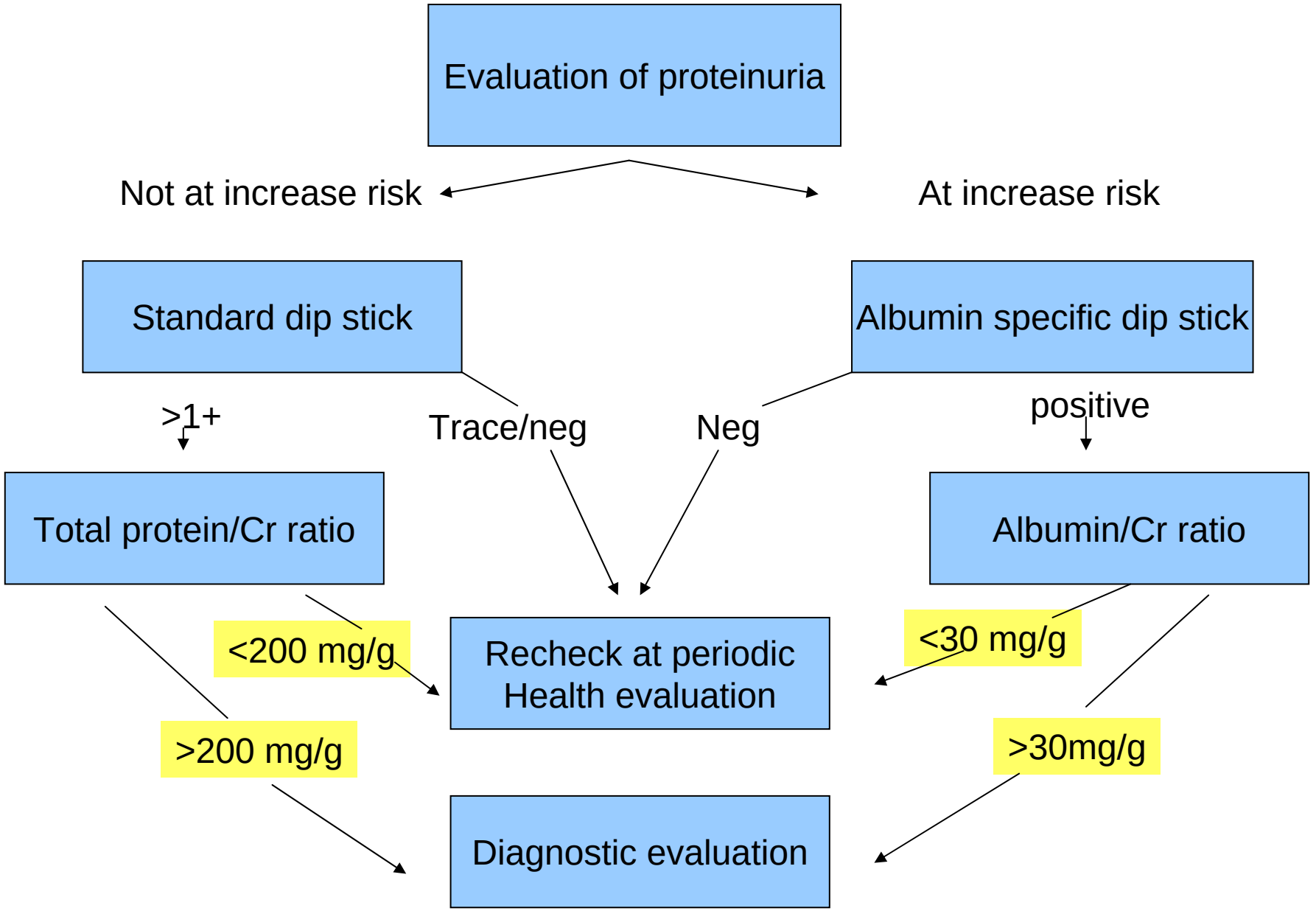
- 24 hr. urine collection
  - Error if inadequate collection
  - Confirm by urine volume, urine Cr.>1 gm
- First morning urine albumin/creatinine
  - 20 mg/gm.
- Dip stick for microalbuminuria
  - Convenience for screening test
  - Recommended by K/DOQI

Who should be tested for proteinuria

- Study model
  - Cost-effectiveness of screening and treatment of proteinuria in elderly
- Study in Netherland
  - Cost-effectiveness in elderly
- Screening is not recommended in normal, healthy population
- Screening in high risk group

Screening for micro/ macroalbuminuria in high risk

- Diabetes
  - microalbuminuria
  - 5 years after diagnosis in type 1,immediate at diagnosis in type 2
- Hypertension
  - After diagnosis and every year
- History of CKD
  - Every year


Evaluation of proteinuria
Not at increase risk
At increase risk
Standard dip stick
Albumin specific dip stick
>1+
Trace/neg
Neg
positive
Total protein/Cr ratio
Albumin/Cr ratio
<200 mg/g
Recheck at periodic
Health evaluation
<30 mg/g
>200 mg/g
>30mg/g
Diagnostic evaluation

Management of asymptomatic proteinuria

- Proteinuria<1 gm/day: low risk for progressive renal failure
- Definite diagnosis: kidney biopsy
- Alternative:
  - Follow up BP, proteinuria
  - Management as nephrotic syndrome if proteinuria>3 gm/day

Proteinuria in hypertension, obesity, dyslipidemia

- Marker of endothelial injury
- Increase cardiovascular risk
- Management:
  - Decrease risk factor
  - Control BP, lipid
  - Keep ideal body weight
  - Stop smoking

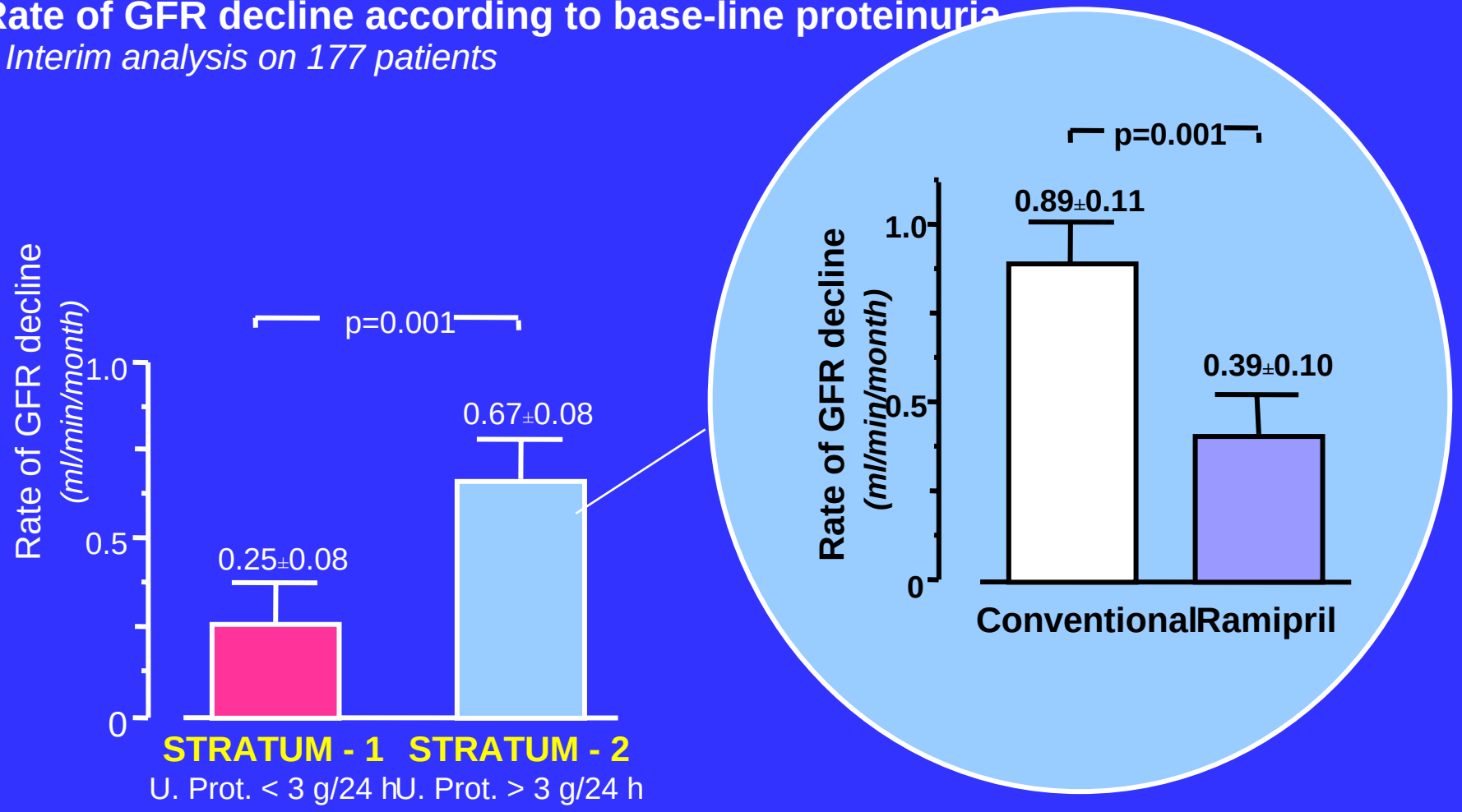
Treatment of proteinuria with ACEI, ARB

- Decrease intra-glomerular pressure
- Decrease proteinuria
- Slow progression of kidney disease in both diabetes and non-diabetes

REIN CORE

Rate of GFR decline according to base-line proteinuria

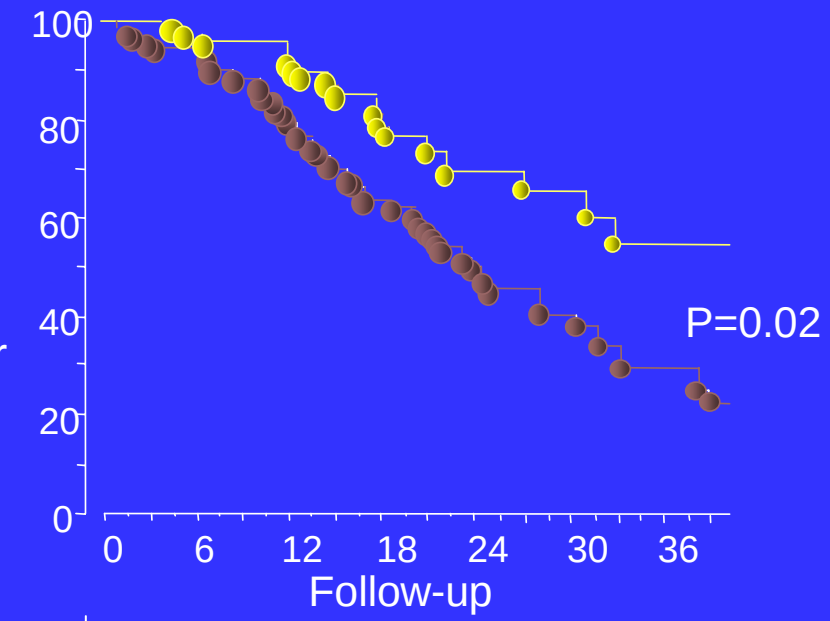
- Interim analysis on 177 patients



Kidney survival: Conventional **54 %** Ramipril **77 %**

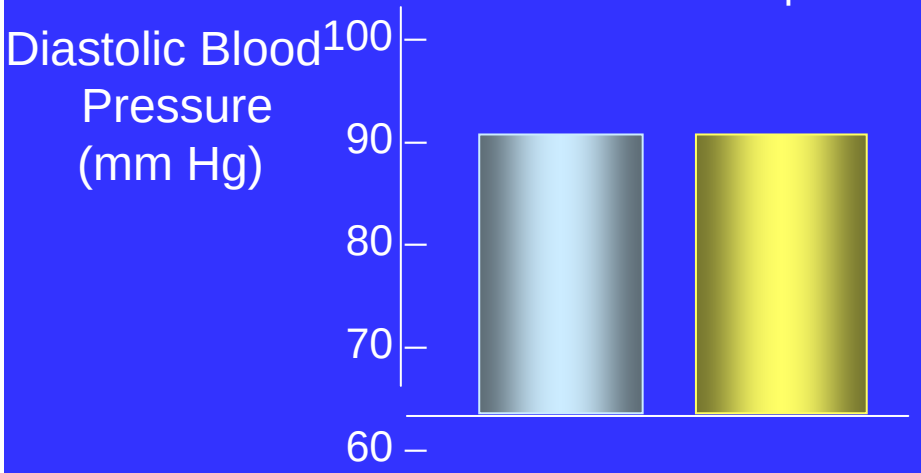
GISEN Group, *Lancet,* 1997

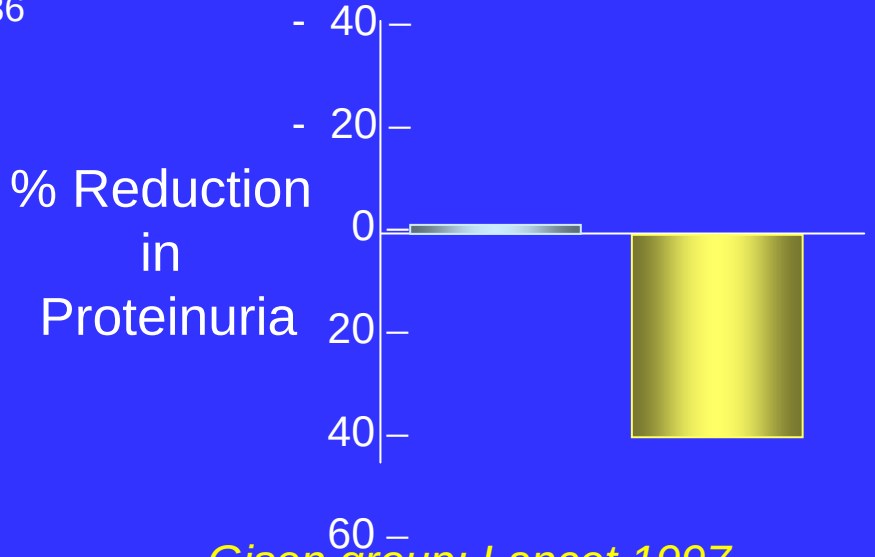
REIN: ACE-I IS MORE RENOPROTECTIVE THAN CONVENTIONAL THERAPY IN NON-DIABETIC RENAL DISEASE



Ramipril

Conventional therapy





Gisen group; Lancet 1997

Microscopic hematuria

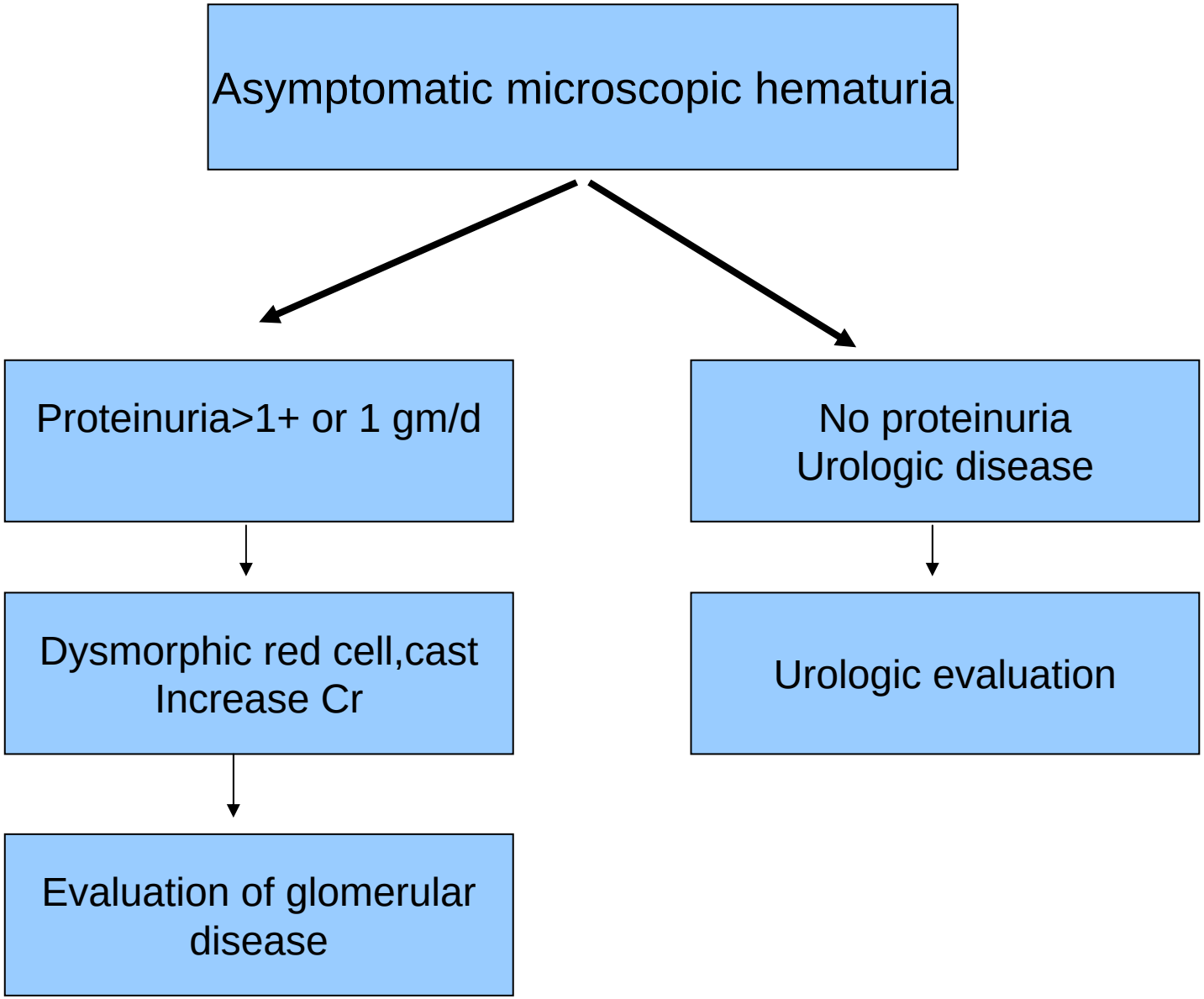
- 9-18% of normal population
- Detect by dipstick
- Microscopic examination
  - RBC >3/high power field in spun urine
  - Significant if detected 2/3 of examination

Etiology of hematuria

- Life threatening condition
  - Urologic malignancy, lymphoma
- Significant condition, need treatment
  - Stone, BPH, UTI, renal parenchymatous disease
- Significant condition, need follow up
  - BPH, cystitis, polycystic kidney disease
- Non-significant
  - Renal cyst, prostatic stone

Who should be tested for hematuria

- Screening test is not recommended in normal, healthy population
- High risk for cancer group:
  - Elderly > 40 year-old
  - Smoking
  - History of pelvic radiation
  - History of dye or chemical exposure


Asymptomatic microscopic hematuria
Proteinuria>1+ or 1 gm/d
No proteinuria
Urologic disease
Dysmorphic red cell,cast
Increase Cr
Urologic evaluation
Evaluation of glomerular disease

Urological evaluation

- IVP
  - Screening test
  - Low sensitivity for small mass
- Ultrasonography
  - High sensitivity for cystic mass
- CT scan
  - Sensitivity = MRI
  - Higher sensitivity for spiral CT in detection of stone

Course of microscopic hematuria & guideline of follow up

- No cause found in 8-10%
- Uroepithelial cancer 1-5% in 3 years
- Follow up every 6 months till 3 years
- Worsening signs: hypertension, decrease GFR, proteinuria
  - Evaluation for renal parenchymatous disease

Conclusion

- Proteinuria & hematuria: signs of kidney injury
- Proteinuria: key factor for progression of kidney disease
- Screening should be done in high risk group
- No strong recommendation for screening in normal population