

The Role of Obesity on Chronic Kidney Disease in Primary Care: An Integrative Review

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Background

- Chronic kidney disease (CKD)
 - Abnormal structure and/or reduced glomerular filtration rate (GFR) for at least three months and with implication for health (Jha et al., 2013, Kidney Disease Improving Global Outcomes [KDIGO], 2012)
 - Severity determined by cause, GFR, albuminuria
 - Complications:
 - Narrowed therapeutic drug ranges, cognitive decline, cardiovascular and all-cause mortality, and acute infectious disease-associated mortality

Background, cont.

- **Affects 24.5% of people >60 years old** (National Kidney and Urologic Diseases Information Clearinghouse [NKUDIC], 2012)
- **Increasingly managed in the primary care setting**
- **Medicare expenditure on CKD was \$41 billion in 2010** (United States Renal Data System [USRDS], 2012)

Background, cont.

- Obesity
 - Body mass index (BMI) >30
 - Creates a chronic state of systemic inflammation and increases oxidative stress targeting renal tissue (Tang, Yan, & Zhuang, 2012)
 - Current prevalence more than double that of 1960 (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2012)
 - 1 in 3 adults considered obese (NIDDK, 2012)

Background, cont.

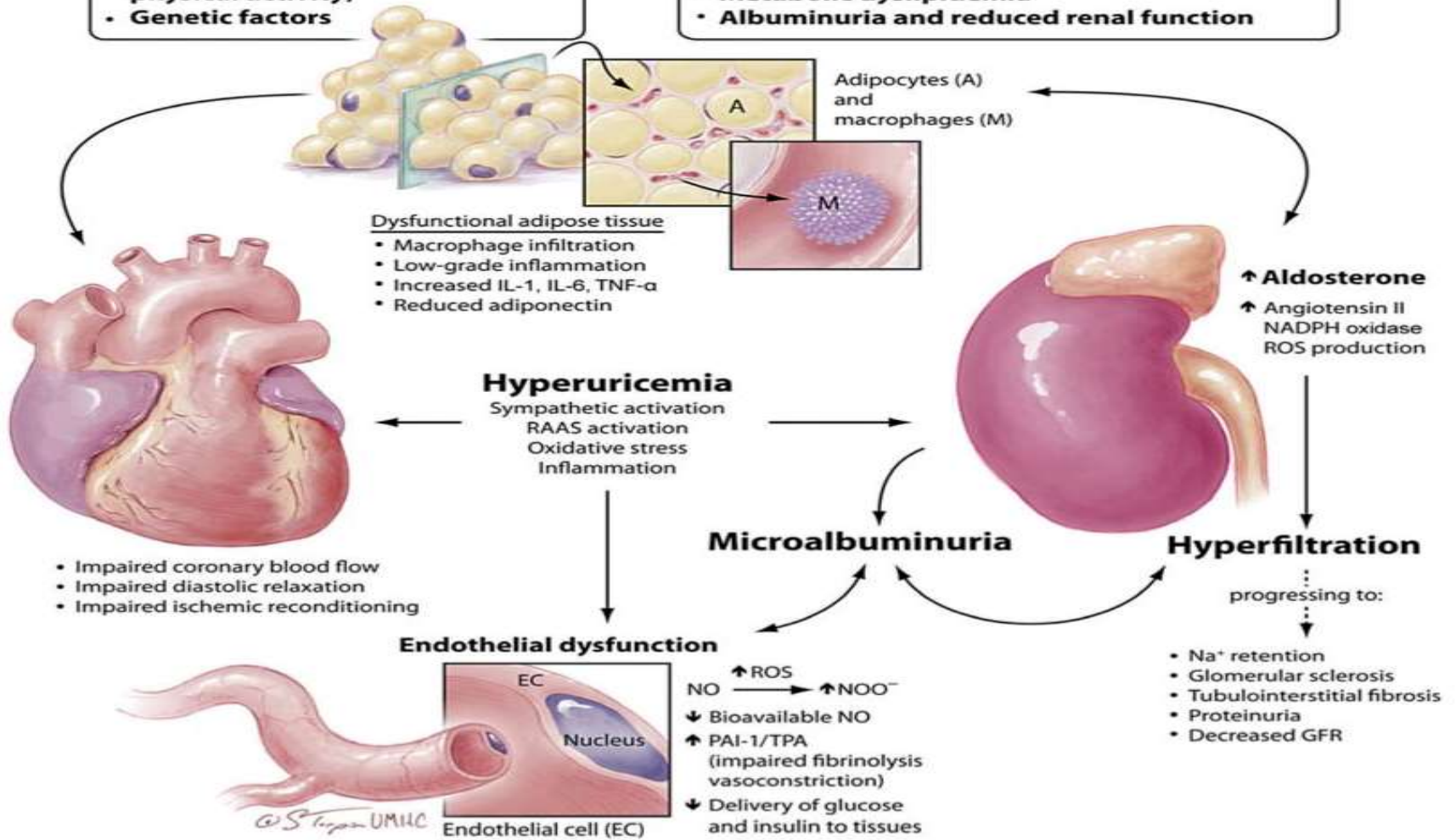
- Compensatory increase in GFR (hyperfiltration) → glomerular hypertrophy → microalbuminuria
- Elevated blood pressure → proteinuria, nodular glomerulosclerosis, tubulointerstitial injury, and eventual decreased GFR

Overweight and obesity

- Environmental factors (especially high-fructose diet and decreased physical activity)
- Genetic factors

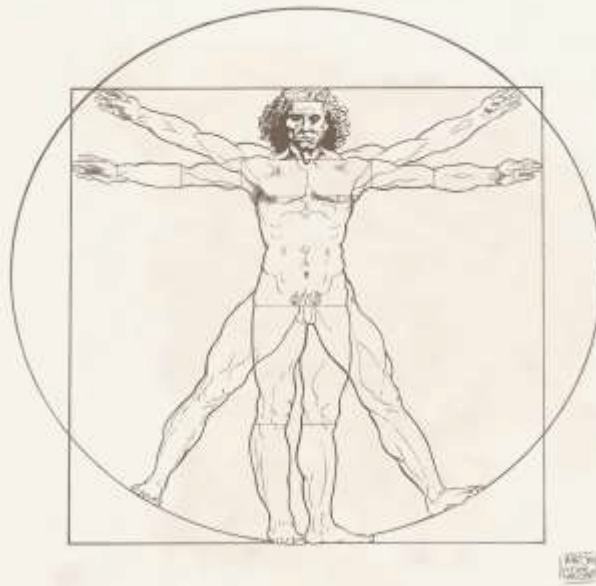
Cardiorenal metabolic syndrome

- Central obesity
- Insulin resistance
- Hypertension
- Metabolic dyslipidemia
- Albuminuria and reduced renal function



Purpose

- Examine the information related to obesity and CKD development and discuss the implications as they relate to primary care practice.



Methods

- Search strategy
 - Integrative literature review
 - Primary studies, review articles, and clinical practice guidelines
 - January 1, 2009 through December 31, 2014
 - Participants at least 18 years old, obese, and in any stage of CKD

Methods, cont.

- Selecting and Evaluating
 - Performed independently by Long
 - Title and abstracts
 - Ultimate inclusion from review of the full article
 - Appraisal performed using the PRISMA guidelines
(Moher et al., 2009)

Results

- Eleven studies: 8,888 participants
 - Weight loss and kidney function comparison
 - Renoprotective effects of decreased BMI
 - Examine articles by renal function:

Results, cont.

- Glomerular Filtration Rate
 - 6 articles
 - 2 randomized control trials (RCT): dietary weight loss (Jesudason, Pedersen, and Clifton, 2013, Tirosh et al., 2013)
 - 2 retrospective observational studies: bariatric surgery (Alexander et al., 2009, Neto et al., 2009)
 - 1 retrospective observational study and 1 cohort study: correlation between GFR and BMI (Herget-Rosenthal et al., 2013, Malkina et al., 2014)

Results, cont.

- Creatinine
 - 1 retrospective observational (Schuster et al., 2010)
 - Intent to show negative effects of obesity surgery
 - Improvement in creatinine with weight loss
- Creatinine and Glomerular Filtration Rate
 - 1 prospective study (Getty et al., 2012)
 - Significant improvement in GFR and creatinine after weight loss of 17.1% with Roux-en-Y

Results, cont.

- Proteinuria and Glomerular Filtration Rate
 - 1 RCT (Shen et al., 2010)
 - Identify effects on obesity-related glomerulopathy
 - Appreciated a direct correlation of urinary protein and renal filtration rate with changes BMI



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Results, cont.

- Creatinine, Proteinuria, and Glomerular Filtration Rate
 - 1 systematic review (Bolignano and Zoccali, 2013)
 - Effects of weight loss on renal function in obese patients
 - 31 studies: bariatric surgery, calorie restriction, lifestyle modification, pharmacologic intervention
 - 1 RCT (Wang et al., 2013)
 - 38 adults participated in a lifestyle modification program

Conclusion

- Increasing obesity rates (NIDDK, 2012)
- All included studies support a correlation between excessive adipose and worsened kidney function
- Early intervention to maximize kidney function improvement
- Renoprotective effects of decreased BMI
- Meaningful and modifiable risk factor

Future Direction

- Primary care:
 - Improving the severity of obesity leads to improved CKD in the primary care setting
 - Risk factor modification and early intervention
 - Assess GFR and Albuminuria at least annually in individuals at high risk for or with known CKD (KDIGO, 2013)
 - Attention to co-morbidity and treatments
 - Recognition and intervention can improve health and healthcare spending

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