Epidemiology in Peripheral Artery Disease

Presented by CPC Clinical Research
Peripheral Artery Disease

• Underlying cause is atherosclerosis

• Survey data of US adults >50 years show
  – 65% are familiar with coronary disease and stroke
  – 25% are familiar with PAD
  – Lower economic levels associated with lack of awareness

Atherosclerosis is a Systemic Disease

TIA, Stroke, CAD, ACS

PAD

8.5 million in US

Peripheral Artery Disease (PAD)

- The presence of a stenosis or occlusion in the aorta or arteries of the limbs
- Usually caused by atherosclerosis
- Associated with an increased risk of death, myocardial infarction, and stroke
- May impair walking or cause critical limb ischemia
Heterogeneity in Biology

Hyperlipidemia, Smoking, Hypertension, Inflammation, Stress, Diabetes

Intimal/subintimal Disease

Low ABI ≤ 0.9

Renal Dysfunction, Diabetes
(Calcium & Phosphate Regulation, Osteogenesis, Local Cellular Dysfunction)

Medial Calcification

High ABI ≥ 1.3

Peripheral Artery Disease

• Globally 200 million people have PAD

• PAD is increasing worldwide
  – High rates of smoking in certain regions of world
  – Rising incidence of type 2 diabetes
  – Advancing age of population

Fowkes FGR et al. Nat Rev Cardiol 2017;14:156-70
Increasing Prevalence of Peripheral Artery Disease

People Living with PAD (Global Estimate)

~20% of People ≥ 65 Years Old

Rate of change 23.93%

2000: 163,000,000

2010: 202,000,000

Fowkes et al. Lancet 2017;14:156-170
Peripheral Artery Disease

- PAD is associated with many of same risk factors as cardiovascular disease
- Data from National Health and Nutrition Examination Survey (n=2174)
- Over age 40 years prevalence was 4.3%
- Increased with age

Risk Factors for PAD

- Smoking
- Diabetes
- Hypertension
- Hypercholesterolemia
- Chronic renal insufficiency
- C-Reactive Protein

Relative Risk

Peripheral Artery Disease

- Genetics also thought to contribute to PAD

- Genome wide association study in the million veteran program

- Replicated from UK biobank

- 19 PAD loci identified
  - 11 associated with coronary, cerebral, and peripheral vascular disease
  - 4 specific to PAD
Genetic Drivers of Risk in Peripheral Artery Disease

Peripheral Artery Disease

• The prevalence of PAD varies depending on the population selected

• Various studies from different cohorts and countries range from 4-30%

• Age is obviously a major risk factor but not modifiable

Documented Prevalence of PAD

- NHANES Age ≥70: 14.5%
- Rotterdam Age >55: 19.1%
- Diehm Age ≥65: 19.8%
- PARTNERS Age >70, or between 50–69 with diabetes or smoking: 29%

- NHANES Age >40: 4.3%
- San Diego Mean Age=66: 11.7%

Peripheral Artery Disease

• PAD prevalence also changes based on ethnicity in US

• Particularly true in African Americans and American Indians
Estimates of prevalence of PAD in females by age and ethnicity

Estimates of prevalence of PAD in males by age and ethnicity

[Bar chart showing prevalence of PAD by age and ethnicity for different racial groups, with age categories 40-49, 50-59, 60-69, 70-79, and ≥80, and prevalence rates for NH White, African American, Hispanic, Asian, and American Indian groups.]

Peripheral Artery Disease

• PAD is also more prevalent in regions of the world with higher incomes and GDP

• Very different than some other diseases

• Related to differential prevalence of major risk factors

• There is evidence that the burden is shifting some to lower income countries

Age-standardized prevalence of PAD per 100,000 both sexes, 2017

Estimate of the number of cases, and contributing age groups, in eight WHO regions in the year 2010

Global prevalence of PAD by age in males in females in high-income countries and low-income or middle-income countries 1995-2009

Peripheral Artery Disease

• PAD prevalence increases with the age of the population examined as well as enrichment with PAD risk factors such as diabetes

• PAD is markedly more prevalent in certain racial groups
  – African Americans
  – American Indians

• PAD prevalence is on the rise globally
  – Aging of population
  – Increase in risk factors – especially diabetes