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Michael Butler
University of North Dakota

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Analysis of Metabolic Syndrome as a Modifiable Risk Factor for Prostate Cancer

Michael Butler PA-S

Department of Physician Assistant Studies, University of North Dakota School of Medicine & Health Sciences

Grand Forks, ND 58202-9037



Abstract

- Prostate cancer and metabolic syndrome are both prevalent among men in developed countries with peak incidence after age 50.
- Prostate cancer has no known modifiable risk factors.
- Most risk factors for metabolic syndrome are modifiable.
- If metabolic syndrome is identified as contributing to the risk of prostate cancer it would give an element of self determination to men at risk for prostate cancer.
- Past studies provide conflicting results in the correlation between these two conditions.
- A literature review was performed to evaluate consistencies in current literature.
- Metabolic syndrome or its components do not increase the risk of developing overall prostate cancer.
- Metabolic syndrome does increase mortality from prostate cancer.
- Men with metabolic syndrome are found to have higher grades of disease upon diagnosis of prostate cancer

Introduction

- Risk factors for prostate cancer include only: age, race and family history.
- In the US 180,000 new cases of prostate cancer and 26,000 deaths per year.
- Low sensitivity of screening tests leads to unnecessary procedures and complications.
- Clinically insignificant cancer is often diagnosed on autopsy.
- Risk factors for metabolic syndrome include high fat low fiber diet and sedentary lifestyle among others.
- Metabolic syndrome is defined as having 3 of 5 abnormal: Triglycerides, serum glucose, HDL, blood pressure and weight.

Statement of the Problem

- Both conditions are found in similar cohorts.
- Metabolic syndrome has been proven modifiable through lifestyle modification while Prostate Cancer is unavoidable.
- Past literature makes differing conclusions on the correlation between the two.

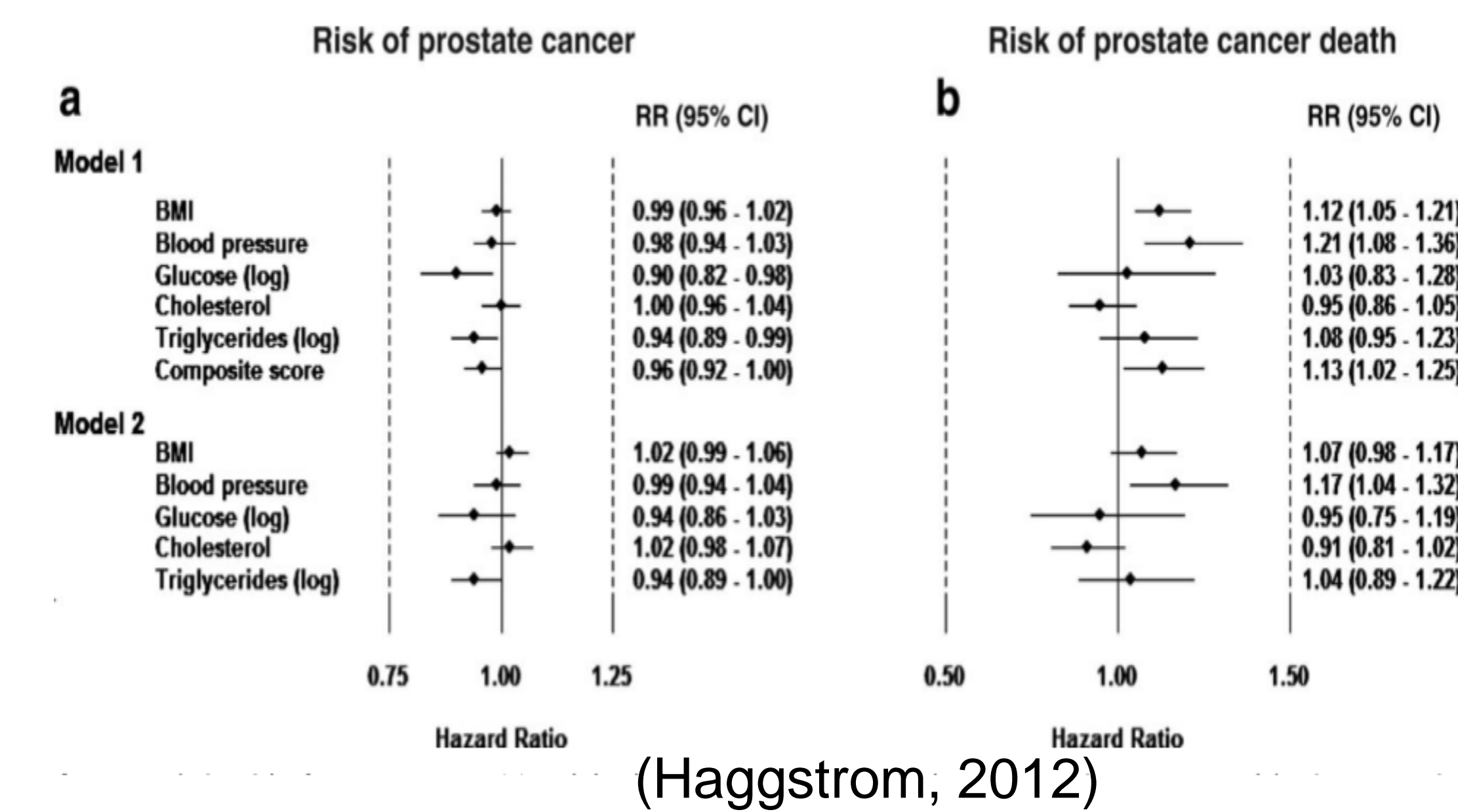
Research Question

- Are men with a diagnosis of metabolic syndrome at increased risk for developing prostate cancer compared to men without?
 - Prostate cancer is defined as overall cases.
 - No differentiation is made between high and low grade cancer based of Gleason score or presence of symptoms.
- Do any of the individual components of metabolic syndrome increase the risk for developing prostate cancer?
 - Metabolic syndrome components include
 - Above normal serum triglyceride levels
 - Above normal serum glucose levels
 - Below normal serum HDL
 - Elevated blood pressure
 - Above normal weight

Literature Review

- Metabolic syndrome does not increase the risk of developing cancer. Diabetes may be protective against developing prostate cancer (Wallner, 2010).
- There is no significant correlation found between metabolic syndrome and prostate cancer (Lawrence,2012).
- No individual components of metabolic syndrome or any composite grouping of them increase the risk of prostate cancer, increased mortality found (Haggstrom, 2012).
- Metabolic syndrome specifically including hypertension increased the risk of prostate cancer. Hypertension alone does not increase risk, metabolic syndrome without hypertension does not increase risk (Radisauskas, 2016).
- Hypertension does increase the risk of overall prostate cancer (Liang, 2016).
- Men with metabolic syndrome have greater risk of high grade prostate cancer than those without (Zhang, 2015)
- No individual component of metabolic syndrome increases the risk of prostate cancer (Bhindi, 2014).
- Men with metabolic syndrome have higher grades of disease upon prostate biopsy (De Nunzio, 2011).
- One metabolic syndrome component was protective against prostate cancer, 2 or more components were associated with higher grades of cancer on diagnosis (Sourbeer, 2014).

Results



- This figure is a graphical representation of the relationship between metabolic syndrome components and both overall prostate cancer and death from prostate cancer.
- Model 1 Corrected for random error using the regression dilution ratio.
- Model 2 corrected for random error using regression calibration.
- Composite score is as compilation of the z scores calculated for each individual component.

Discussion

- Due to inconsistencies in the definition of metabolic syndrome, cross study comparisons must be qualitative which leads to inaccuracies.
 - For example one study will classify hypertension by blood pressure measurement while others use a prescription of antihypertensive medication to define it.
- The strongest evidence available indicates no positive correlation between metabolic syndrome as a whole and overall prostate cancer.
- Studies indicating individual components of metabolic syndrome increase the risk of prostate cancer have weaknesses which undermine their results, coupled with weak statistical correlations.
- Good quality evidence supports a correlation between the number of metabolic components a man has and the grade of prostate cancer he has upon diagnosis.
 - This is further supported by strong evidence for increased mortality from prostate cancer among men with metabolic syndrome or components.
- Further analysis is needed to investigate the degree to which diabetes is protective against prostate cancer.

Applicability to Clinical Practice

- Practitioners should not alter their practice from established guidelines to screen for prostate cancer in the presence of metabolic conditions.
- Current prostate cancer screening guidelines.
 - American College of Physicians
 - Shared decision making age 50-60 with >15 years of life expectancy.
 - American Cancer Society
 - Shared Decision Making at age 50 for men of average risk.
- Providers should be mindful that men with metabolic disorders will likely have more advanced prostate cancer when diagnosed than men without.
- Be mindful of the of the importance of preventative medicine when caring for patients with complex medical histories.
- Prostate cancer screening requires shared decision making. Knowledge of advanced disease should be part of the conversation about screening.

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