# Vascular Disease and Prostate Cancer: A Conflicting Association

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**Abstract:**

*Background*: To date, only a few studies have explored the relationship between vascular disease and Prostate Cancer (PCa), with conflicting results. The Aim of the research was to investigate the association of carotid vascular disease (CVD) or Coronary Artery disease (CAD) with PCa hormone-naïve at initial diagnosis.

*Methods*: Retrospective analysis of 266 patients undergoing prostate biopsy at our institution between 2006 and 2009 was conducted. We examined associations of CVD or CAD in 133 patients with PCa diagnosis versus 133 age-matched controls. Men with incomplete data available, history of hormone therapy or chemotherapy, prostate or bladder surgery were excluded.

*Results*: CVD was significantly linked to PCa in all cases versus controls at initial diagnosis of PCa (OR 2.42, $p < 0.05$). Similarly CAD was significantly related to PCa at initial diagnosis (OR 1.88, $p < 0.05$).

*Conclusions*: In our study a significant relation was found between vascular damage and PCa hormone-naïve at initial diagnosis. Further research should elucidate these associations in larger samples to confirm these relationships and to stabilize future prevention strategies.

**Keywords:** Carotid vascular disease, Coronary artery disease, Vascular disease, Prostate Cancer.

## 1. INTRODUCTION

Few studies explored the relationship between vascular disease and PCa with no consensus. Some studies have found no association between atherosclerotic disease and PCa [1,2]. In contrast, several other studies have found a relation between atherosclerotic vascular disease and PCa [3-5]. The aim of the research was to investigate the association of atherosclerotic disease with PCa hormone-naïve at initial diagnosis.

## 2. METHODS

A Retrospective analysis of 266 patients undergoing prostate biopsy at our institution between 2006 and 2009 was conducted. We examined associations of carotid vascular damage (CVD) or Coronary artery disease (CAD) in 133 patients with PCa diagnosis, with positive biopsy, versus 133 age-matched controls, with negative biopsy. Men with incomplete data available, history of hormone therapy or chemotherapy, prostate or bladder surgery were excluded.

At baseline, a medical history for CAD or CVD for cases and controls was obtained. CVD was also evaluated by B-mode ultrasound-based method. Subjects were considered as normal if no lesion was detected, or having carotid atherosclerosis when a plaque, stenosis or occlusion was detected in at least one segment of common, bifurcation or internal carotid artery.

Differences in the distribution of continuous variables between study groups were described as median or media ± standard deviation (SD) and assessed for statistical significance with Mann-Whitney Rank Sum Test or t-test. Differences in the distribution for categorical variables were expressed as number of patients (frequencies and percentage) and evaluated using Chi-square testing of independence; however, when low cell counts were found, Fisher's exact testing was utilized. Odds ratios and 95% CI's were calculated in each group. A P value < .05 was considered statistically significant.

## 3. RESULTS

Cases and controls were age-matched (69 years versus 68 years, respectively; p=0,322). In our study 23% and 17% of PCa patients had a history of CAD or CVD at initial diagnosis, respectively.CVD , particularly, was significantly associated to PCa in all cases versus controls (OR 2.43, $p < 0.05$). Similarly, CAD was significantly related to PCa at initial diagnosis in all cases versus controls (OR 1.88, $p < 0.05$) (Figures **1**, **2**).

## 4. DISCUSSION

The aim of study was to examine the association between vascular disease and PCa at initial diagnosis.

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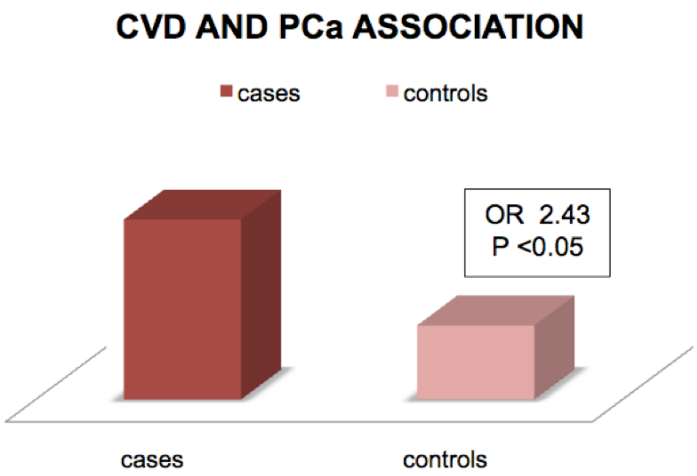


**Figure 1: CVD and PCa association in PCa at initial diagnosis.**
The figure showed a statistical significant association between CVD and PCa in patients with positive biopsy versus controls (OR 2.43, p < 0.05).

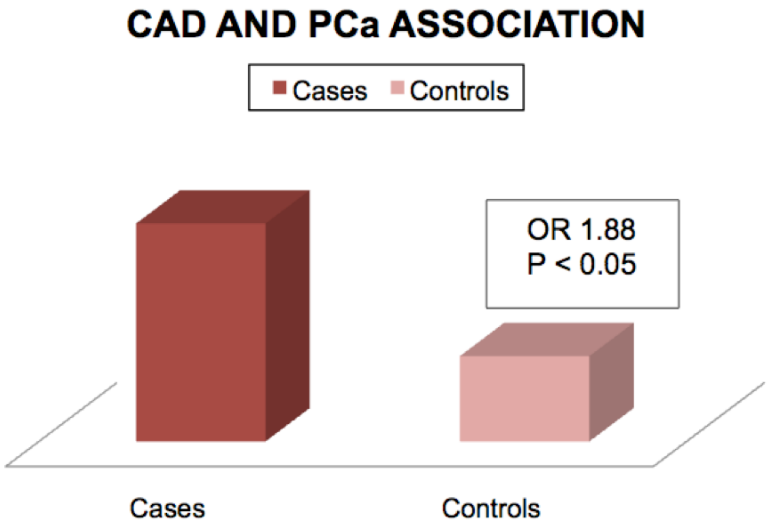


**Figure 2: CAD and PCa association in PCa at initial diagnosis.**
The figure showed a statistical significant association between CAD and PCa in all patients with positive biopsy, versus controls (OR 1.88, p < 0.05).

More than 30% of men with PCa die of cardiovascular disease, which constitutes one of the most common causes of death in this patient population [6-8].

In our study a significant association was found between CVD and CAD with PCa hormone-naïve at initial diagnosis.

To date, only few studies have explored this relationship, with conflicting results [1-5]. Similarly to our study, in REDUCE study CAD was associated with a 35% increased risk of PCa diagnosis [5]. Our findings are also consistent with autopsy study of Stamatiou, suggesting that men with PCa had greater advanced atheromatosis on the coronary arteries than subjects without PCa [3].

Atherosclerosis is considered an inflammatory process as proposed by the response to the injury hypothesis [9]. Although there are no other studies evaluating the association of CVD and CAD with PCa hormone naïve at initial diagnosis, our findings are consistent with prospective study of Pereira which demonstrated baseline IMT values were higher in the PCa group. Interestingly, another marker of endothelial injury, levels of Vascular Cell Adhesion Molecule 1 (VCAM-1), decreased in this group after RT. The authors hypothesized that the inflammatory process related to malignancy might have been reduced with

treatment, overcoming the potential adverse effects from irradiation itself to the vasculature. It is now well accepted that cancer also causes an inflammatory-like condition, characterized by elevated inflammatory biomarkers such as PCR, Prostaglandins, adhesion molecules, [9-11].

If confirmed in other studies, our results suggested that CAD and CVD could be PCa risk factors and suggests common shared etiologies [5].

MSR1 has been recognized as an important genetic factor that confers an increased risk of developing PCa and vascular disease in many populations. Some linkage studies relate this gene to PCa and to some pathologies, such as Alzheimer disease and atherosclerosis [12-21].

The MSR1 protein is involved in an array of hormonal and pathological processes, including inflammation, innate and adaptive immunity, oxidative stress and apoptosis [18,19]. The initial report of MSR1 showed a strong link between MSR1 mutations and hereditary PCa in men of both European and African descent [18]. Mutations in MSR1 have been shown to be associated with PCa risk in both hereditary and sporadic cases in European and African American men [21]. Association studies of variants within MSR1 with PCa show both positive and negative results [18]. Our results indicate that there could be an association between vascular disease and PCa, however due to the relatively low sample further studies are needed in order to confirm such findings.

## CONCLUSIONS

The chronic proinflammatory state and oxidative stress associated with atherosclerosis may contribute to PCa development and progression and exert early vascular and prostatic disease. Further research should elucidate these relations in larger samples to confirm these associations and to stabilize future prevention strategies.

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