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Opinion Article

Epidemiology and Risk Factors Associated with Peripheral Vascular Diseases

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DESCRIPTION

Peripheral Vascular Diseases (PVD) represent a heterogeneous group of disorders affecting the arterial, venous and lymphatic systems outside the central cardiovascular network. These conditions, including Peripheral Artery Disease (PAD) and chronic venous disorders (CVD), are associated with significant morbidity, functional impairment and an increased risk of systemic cardiovascular events. Globally, PVD represents a major public health concern due to its high prevalence and chronic nature, which often results in progressive disability and diminished quality of life. Epidemiological data reveal considerable variation in prevalence across age, sex, ethnicity and geographic regions, emphasizing the importance of understanding risk factors for early detection and management.

The prevalence of PAD has been estimated at approximately 200 million individuals worldwide, with marked increases in populations over 60 years of age. Chronic venous disorders, including varicose veins and chronic venous insufficiency, affect an estimated 30%-40% of adults, with women experiencing a higher burden than men, primarily due to hormonal influences, pregnancy and structural differences in venous compliance. Age is a consistent predictor of both arterial and venous PVD, as vascular structures undergo cumulative functional decline over time. Men tend to have a slightly higher incidence of PAD, whereas women demonstrate increased susceptibility to chronic venous conditions. Socioeconomic factors, including education level, occupational exposures and access to healthcare, also influence disease prevalence, with higher incidence observed in populations engaged in prolonged standing or sedentary work and in communities with limited preventive care access.

Peripheral vascular disease arises from a combination of structural and functional vascular alterations, with risk factors broadly categorized as non-modifiable and modifiable. Non-modifiable risk factors include advanced age, genetic predisposition and family history of vascular disorders. Age-related vascular changes include arterial stiffening, reduced venous valve competence and endothelial dysfunction, which collectively impair circulatory efficiency and predispose individuals to venous reflux and atherosclerotic plaque formation. Genetic factors influence connective tissue integrity, venous valve morphology and susceptibility to thrombotic events, contributing to individual variability in disease onset and progression.

Modifiable risk factors are critical targets for prevention and management. Cigarette smoking remains a major contributor to PVD, particularly PAD, through mechanisms involving endothelial injury, oxidative stress, inflammation and accelerated atherogenesis. Hypertension and diabetes mellitus further exacerbate vascular compromise by promoting arterial wall remodeling, microvascular dysfunction and impaired tissue perfusion. Dyslipidemia, particularly elevated low-density lipoprotein cholesterol, accelerates plaque formation and arterial obstruction. Obesity is associated with increased intra-abdominal and venous pressures, impaired calf muscle pump function and chronic low-grade inflammation, increasing the risk of both arterial and venous disease. Physical inactivity compounds these risks by reducing venous return, decreasing vascular shear stress and impairing endothelial function.

Other significant risk factors include prior deep vein thrombosis, which predisposes patients to post-thrombotic syndrome and chronic venous insufficiency and pregnancy, which increases venous wall stress due to hormonal changes and augmented blood volume. Occupational risk factors, particularly prolonged standing or sedentary work, promote venous hypertension and valve incompetence. Chronic inflammatory states, autoimmune disorders and recurrent infections can exacerbate endothelial dysfunction and vascular remodeling, further increasing disease susceptibility.

Geographical and demographic variations in PVD prevalence highlight the influence of lifestyle, healthcare infrastructure and population demographics. Developed countries report higher PAD prevalence due to increased longevity and high rates of comorbidities such as diabetes and obesity. Chronic venous disorders, though widespread globally, are often underdiagnosed and undertreated, allowing disease progression and the development of complications such as venous ulcers and impaired mobility. Early identification of high-risk populations, including older adults, smokers, diabetics and individuals with a family history of vascular disease, is essential for implementing preventive measures and mitigating long-term complications.

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CONCLUSION

In conclusion, peripheral vascular diseases constitute a significant clinical and public health challenge, with prevalence influenced by age, sex, genetics, comorbid conditions and lifestyle factors. Both non-modifiable and modifiable risk factors contribute to disease development and progression, with smoking, diabetes, hypertension, obesity and physical inactivity being particularly significant. Comprehensive understanding of epidemiology and risk factors enables the implementation of targeted prevention strategies, early diagnosis and individualized management, thereby reducing morbidity, improving functional outcomes and enhancing quality of life in affected populations.