

# HYPERTENSION AND VTE

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## ABSTRACT

■ The relationship between high blood pressure and VTE has been researched in this project. Hypertension (HTN) is a major medical burden throughout the world. In 2000, it was estimated that approximately 1 billion people Worldwide. HTN is often accompanied by thickening of the interior wall of the blood vessels, and results in thrombotic events. It is concluded that there is a direct relationship between hypertension and VTE.

## INTRODUCTION

■ HTN is a major medical burden throughout the world. In 2000, it was estimated that approximately 1 billion people Worldwide suffered hypertension with the incidence predicted to increase to 1.56 billion by 2025. Hypertension is a major risk factor for the development of stroke, coronary artery disease, renovascular disease and premature death. Obesity, smoking, alcohol consumption, advancing age, and a lack of education play important roles in the risk of untreated and uncontrolled hypertension. We have researched the link between HTN and arterial vascular disease and conclude there is a direct link between HTN and arterial vascular disease and appears to be due mainly to the mechanical stress placed on the heart and blood vessels.

## WHAT IS HTN?

■ HTN is a condition in which the long-term force of the blood against the artery walls is high enough that it may eventually cause health problems, such as heart disease.

■ Maintenance of arterial blood pressure is necessary for organ perfusion. In patients with high blood pressure, the organs can not receive adequate perfusion causing health issues.

■ Blood pressure (BP, mm Hg) = Cardiac output (CO) x Systemic vascular resistance (SVR)

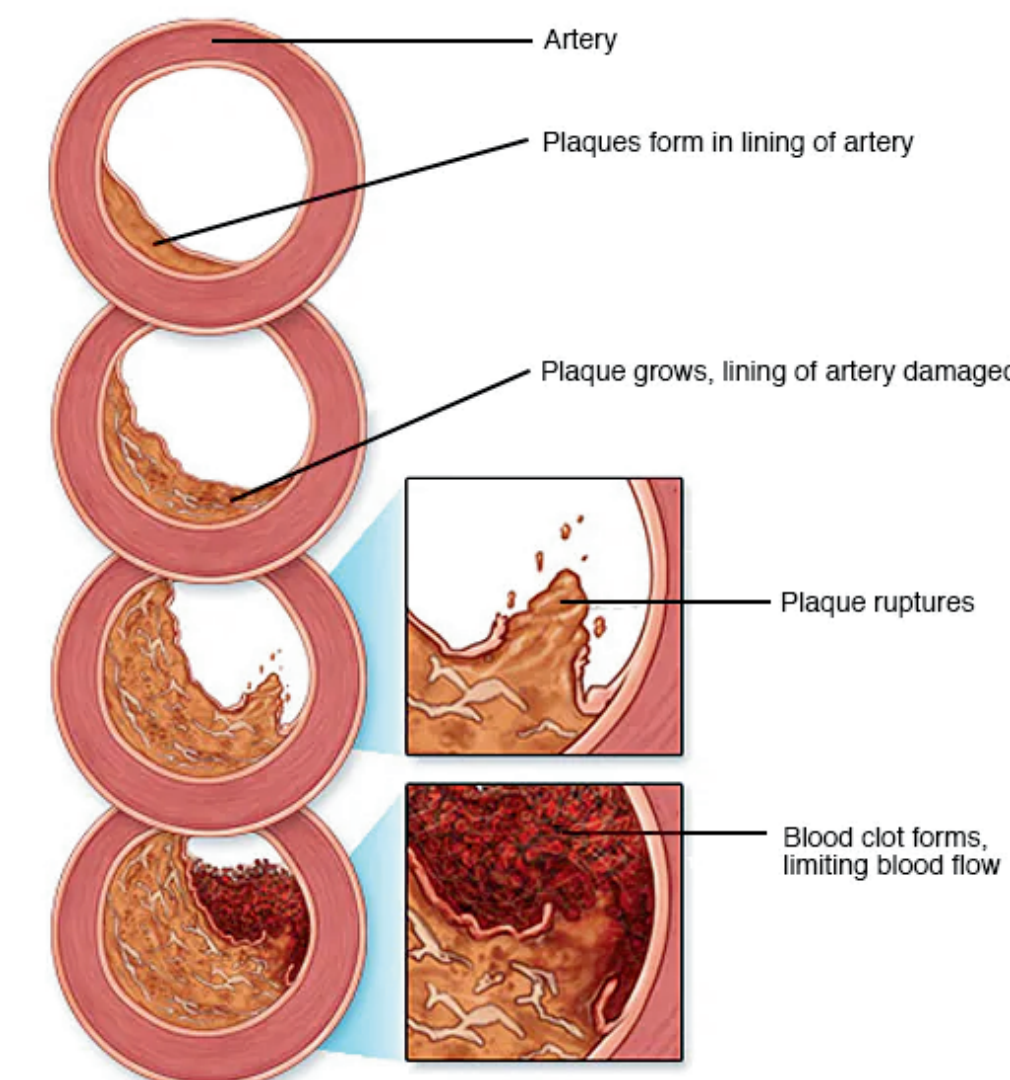
■ The basic underlying pathophysiological processes underlying the major complications of hypertension (myocardial infarction and strokes) are thrombogenesis and atherogenesis.

■ Despite the blood vessels being exposed to high pressures in hypertension, the complications of hypertension are paradoxically thrombotic in nature rather than haemorrhagic.

## ACKNOWLEDGEMENTS

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## HOW DOES HTN CAUSE BLOOD CLOTS?



■ In a healthy individual, arteries are strong and flexible with a smooth inner lining that allows blood to flow freely throughout the body.

■ When an individual suffers from HTN, the blood travels throughout the body at a higher speed and pressure than under normal conditions.

■ The blood flowing at this higher speed and pressure can cause damage to the walls and lining of the arteries.

■ Once the arteries are damaged, there is a high risk that plaques will develop inside the arteries that eventually will form blood clots.

■ Blood clots develop in damaged arteries because the lining isn't smooth anymore.

■ When fats, lipids, cholesterol that come from the foods enter the bloodstream latch on the inner unsmooth surface of the artery and further narrow the arteries.

■ Over time, the narrow arteries prevent or limit blood flow throughout the body.

■ Limiting or preventing the blood from flowing freely throughout the body eventually leads to blood clots.

■ When a person has a blood clot he also has concomitant HTN. HTN also causes blood clots, including conditions such as DVT.

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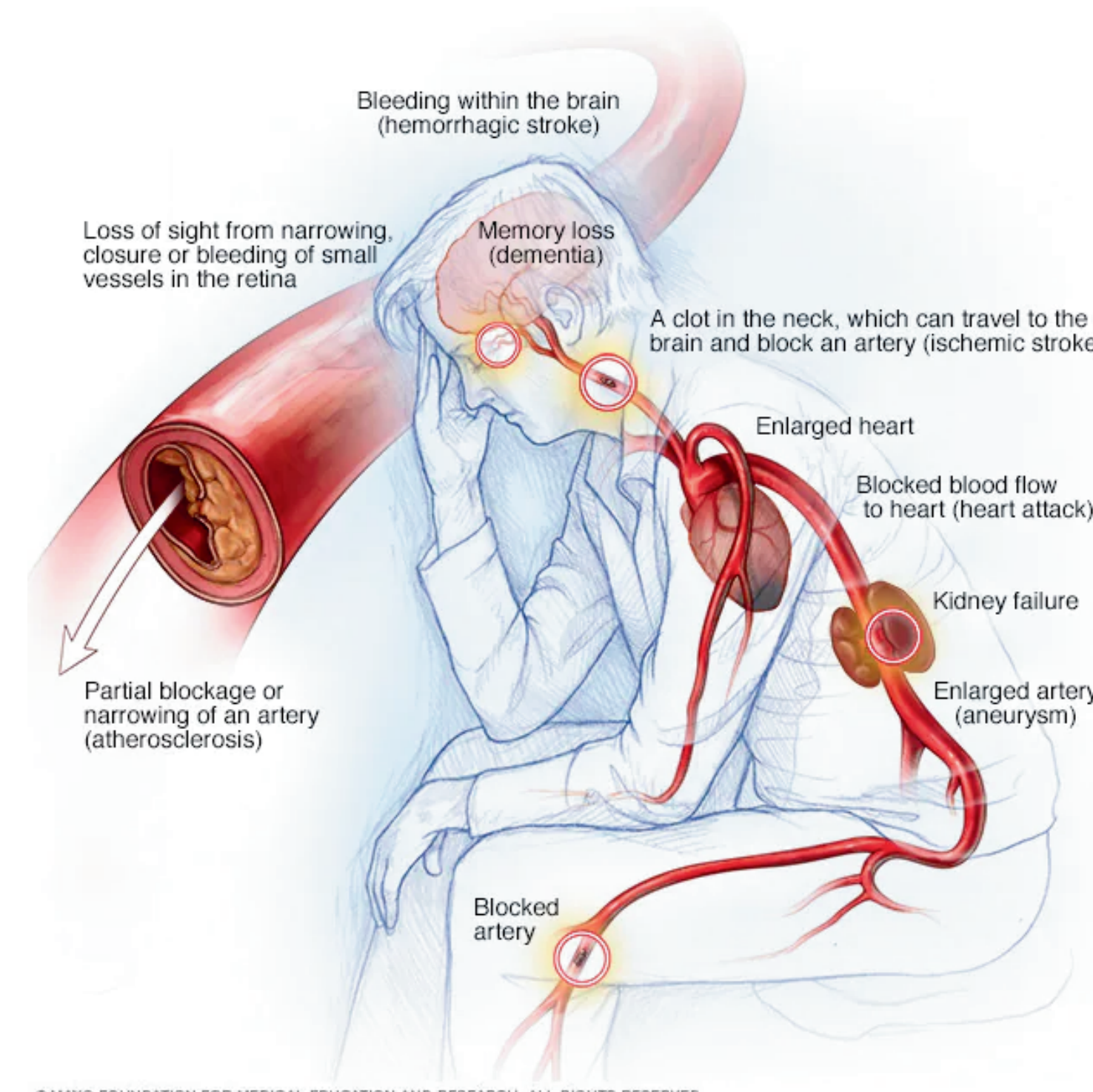
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## THE JOINT NATIONAL COMMITTEE (JNC) 2021 BLOOD PRESSURE GUIDELINES

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	and/or	DIASTOLIC mm Hg (lower number)
<b>NORMAL</b>	<b>LESS THAN 120</b>	<b>and</b>	<b>LESS THAN 80</b>
<b>ELEVATED</b>	<b>120 - 129</b>	<b>and</b>	<b>LESS THAN 80</b>
<b>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1</b>	<b>130 - 139</b>	<b>or</b>	<b>80 - 89</b>
<b>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2</b>	<b>140 OR HIGHER</b>	<b>or</b>	<b>90 OR HIGHER</b>
<b>HYPERTENSIVE CRISIS (consult your doctor immediately)</b>	<b>HIGHER THAN 180</b>	<b>and/or</b>	<b>HIGHER THAN 120</b>

## COMPLICATIONS OF HTN



## DAMAGE TO THE HEART

■ Coronary artery disease: The arteries are narrowed, damaged, and have trouble supplying blood to the heart.

■ Poor blood flow to the heart can lead to angina, arrhythmias, or myocardial infarction.

■ Enlarged left heart. HTN often forces the heart to work harder to pump blood to the rest of the body causing thickening of the left ventricle, which increases the risk of myocardial infarction, heart failure and sudden cardiac death.

■ Heart failure. Over time, the strain on the heart caused by HTN can cause the heart muscle to weaken and work less efficiently.

## DAMAGE TO THE BRAIN

■ HTN may affect the brain in the following ways:

■ Transient ischemic attack (TIA). TIA is a brief, temporary disruption of blood supply to the brain.

■ Stroke. A stroke occurs when part of the brain doesn't get enough oxygen and nutrients, causing brain cells to die. Blood vessels damaged by high blood pressure can narrow, rupture or leak, causing blood clots to form in the arteries leading to the brain, blocking blood flow and causing a stroke.

■ Dementia. Narrowed or blocked arteries can limit blood flow to the brain, leading to dementia.

■ Cognitive impairment. This condition is a transition stage between the changes in understanding and memory that generally come with aging and the more-serious problems caused by dementia.

## CONCLUSIONS

■ The evidence from our research suggests that hypertension appears to confer a prothrombotic or hypercoagulable state, which can be related to conventional risk factors, target organ damage, complications and long-term prognosis, as well as different antihypertensive treatments.

## FUTURE DIRECTIONS

■ Further work is needed to examine the mechanisms leading to HTN and VTE, the potential prognostic and treatment implications, and the possible value of measuring these parameters in routine clinical practice.

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