

Complications

The complications of hypertension can be considered either hypertensive or atherosclerotic. Although the extent of damage often correlates with the level of blood pressure, it is not always the case. Blood pressure and organ impairment should be evaluated separately. The various complications are as follows:

1. Hypertensive Heart Disease

- Hypertension has the following effects on the heart: left ventricular hypertrophy, increased risk of coronary artery disease, arrhythmias, congestive cardiac failure and sudden death.⁹⁶
- Most episodes of left ventricular failure in hypertensive patients are associated with diastolic heart dysfunction.
- Treatment of hypertension can reverse ventricular hypertrophy.^{97,98} However, the impact of reduction of LVH on reduction of morbidity and mortality is still debated.

2. Cerebrovascular Disease

- Hypertension is the most important modifiable risk factor for all types of atherothrombotic stroke⁹⁹ and intracerebral haemorrhage due to rupture of Charcot-Bouchard aneurysms.
- The relation between the incidence of stroke and blood pressure is continuous.^{100,101} A 5-6 mm Hg reduction in diastolic blood pressure reduces the risk of stroke by 40%.¹⁰²
- The SHEP (Systolic Hypertension Elderly Program) study showed substantial benefit following control of systolic blood pressure in the elderly.³⁶

3. Kidney

- About 20-25% of renal failure is attributed to uncontrolled hypertension.¹⁰³
- Development of renal damage is heralded by microalbuminuria, which progresses to overt proteinuria and may further progress to end-stage renal disease.¹⁰⁴
- Reduction of proteinuria can be achieved by effective blood pressure control specially with use of ACE inhibitors and ARBs.^{105,106}

4. Retina

- Hypertensive retinopathy is a condition characterized by a spectrum of retinal vascular signs in people with elevated blood pressure.
- The classification of Keith, Wagener and Barker has been widely used. Grade I retinopathy is characterized by copper wire appearance; Grade II by arteriovenous nicking; Grade III by the presence of haemorrhages and exudates; and Grade IV by papilloedema.
- Grade III and IV retinopathy is seen in long standing uncontrolled hypertension. These changes may regress with effective control of blood pressure.
- Several reviews of hypertensive retinopathy since 1996 have questioned the usefulness of the classification system by Keith, *et al* and its relevance to current clinical practice. Recent studies show that some of the retinal signs (e.g., hemorrhages, microaneurysms and cotton-wool spots) predict stroke and death from stroke independently of elevated blood pressure and other risk factors.¹⁰⁷

5. Large Vessel Disease

- Hypertension is a risk factor for development of intermittent claudication. It also increases the risk of abdominal aortic aneurysms and aortic dissection. Eighty percent of patients with aortic dissection have hypertension.¹⁰⁸

6. Hypertensive crises

Hypertensive crises are classified as hypertensive emergencies or urgencies.

Hypertensive emergencies:

Hypertensive emergencies (Malignant Hypertension) are characterized by severe elevations in BP (>180/120 mm Hg) complicated by evidence of impending or progressive target organ dysfunction. They require immediate BP reduction (not necessarily to normal) often with parenteral agents over a period of 6-8 hours with constant monitoring, to prevent or limit target organ damage. Examples include hypertensive encephalopathy, intracerebral hemorrhage, acute myocardial infarction, acute left ventricular failure with pulmonary edema, unstable angina pectoris, aortic dissection, or eclampsia.²

IV nitroglycerine is generally used although it is not very effective, but specially useful in patients with ischaemic heart disease and left ventricular failure.¹⁰⁹ The recommended dose is initially 5mcg/min, then titrate by 5mcg/min at 3 to 5 minute intervals, upto 10mcg/min. Intravenous enalaprilat is useful in hypertensive emergencies, specially in presence of heart failure. It is used in dosages of 0.625 – 1.25mg bolus every 6 hours. IV Labetalol is also being used in hypertensive emergencies in a bolus dosage of 2-10mg and infusion of 2.5-30 mcg/kg/min. IV esmolol has been shown to be specially useful for peri-operative accelerated hypertension. Usual bolus dose is 80-500 mcg/kg over 1 minute followed by an infusion of 50-300 mcg/kg/min. IV nitroprusside is required rarely, in situations like dissection of aorta and subarachnoid haemorrhage with very high blood pressure. It requires intensive care setting and very close monitoring. The dose is 0.3mcg/kg/min to a maximum of 4mcg/kg/min. Sublingual captopril can also be used when less rapid reduction is required.

Hypertensive urgencies:

Hypertensive urgencies (Accelerated Hypertension) are those situations associated with severe elevations in BP without progressive target organ dysfunction. Examples include upper levels of stage II hypertension associated with severe headache, shortness of breath, epistaxis, or severe anxiety. The majority of these patients present as noncompliant or inadequately treated hypertensives, often with little or no evidence of target organ damage.²

The aim should be safe, prompt and gradual lowering of blood pressure with oral medication over a period of 1-3 days.¹¹⁰ In most urgencies, blood pressure can be controlled with rapidly acting oral medications like calcium channel blockers and ACEI/ARB.

Sublingual nifedipine should not be used in hypertensive crises as it can cause precipitous fall in blood pressure, reflex tachycardia and may precipitate renal, cerebral or coronary ischaemia.^{2,111}