

# Complication prevention

## for patients with hypertension

*A noncommunicable disease education manual for primary health care professionals and patients*







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The Noncommunicable Disease Education Manual for Primary Health Care Professionals and Patients results from the contributions and hard work of many people. Its development was led by Dr Hai-Rim Shin, Coordinator, and Dr Warrick Junsuk Kim, Medical Officer, of the Noncommunicable Diseases and Health Promotion unit at the WHO Regional Office for the Western Pacific (WHO/WPRO/NCD) in Manila, Philippines.

WHO graciously acknowledges the intellectual contributions of Dr Jung-jin Cho, Co-director, Community-based Primary Care Project Committee and Professor, Department of Family Medicine, Hallym University Sacred Heart Dongtan Hospital, Republic of Korea; Dr Hyejin Lee, Volunteer, WHO/WPRO/NCD (currently PhD candidate, Department of Family Medicine, Seoul National University, Republic of Korea); Ms Saki Narita, Volunteer, WHO/WPRO/NCD (currently PhD candidate, Department of Global Health Policy, Graduate School of Medicine, University of Tokyo, Japan); and Mr Byung Ki Kwon, Technical Officer, WHO/WPRO/NCD (currently Director, Division of Health Promotion, Ministry of Health and Welfare, Republic of Korea).

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All illustrations were provided by the source publication.

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# Noncommunicable disease education manual for primary health care professionals and patients

## Part 1 Prevention and management of hypertension

- Module 1 Diagnosis and management
- Module 2 Healthy lifestyles
- Module 3 Healthy eating habits
- Module 4 Low-salt diet
- Module 5 Physical activity
- Module 6 Medication and management of associated diseases
- Module 7 Complication prevention** ◀ YOU ARE HERE

## Part 2 Prevention and management of diabetes

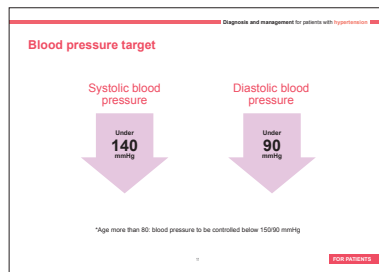
- Module 1 Diagnosis and management
- Module 2 Healthy lifestyles
- Module 3 Healthy eating habits 1
- Module 4 Healthy eating habits 2
- Module 5 Physical activity
- Module 6 Taking care of yourself in daily life
- Module 7 Complication prevention

## Part 3 Quit smoking

# How to use this manual

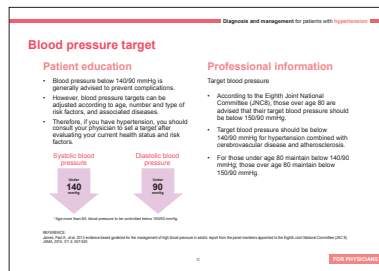
This book is one of fifteen modules of the “Noncommunicable disease education manual for primary health care professionals and patients”. This manual is intended to provide health information on the prevention and control of hypertension and diabetes.

This will be used in the form of a flip chart for health professionals to educate their patients with either hypertension or diabetes.



## FOR PATIENTS

On one side of the flip chart is the ‘**For patients**’ page. This side has simple images and key messages that are easy to understand. However, health professionals may need to provide education for patients to fully understand the content.



## FOR PHYSICIANS

On the other side of the flip chart is the ‘**For physicians**’ page. This side includes information that the health professional can read out to the patient during counselling. Professional information is also provided for further understanding. A small image of the ‘For patients’ side is included so that the health professional is aware of what the patient is looking at.

This publication is intended to serve as a template to be adapted to national context. Images and graphs that have been watermarked should be replaced with images or graphs that represent the national situation. If assistance is required, or if you have any questions related to the publication, please contact the Noncommunicable Diseases and Health Promotion unit at WHO Regional Office for the Western Pacific (wproncd@who.int).

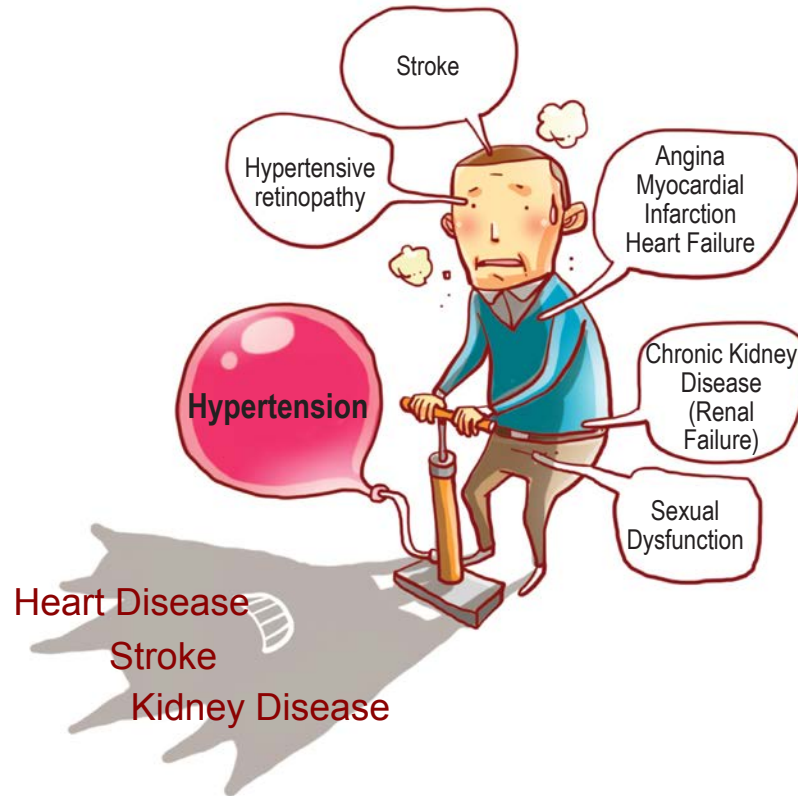
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# Complications – overview (1)

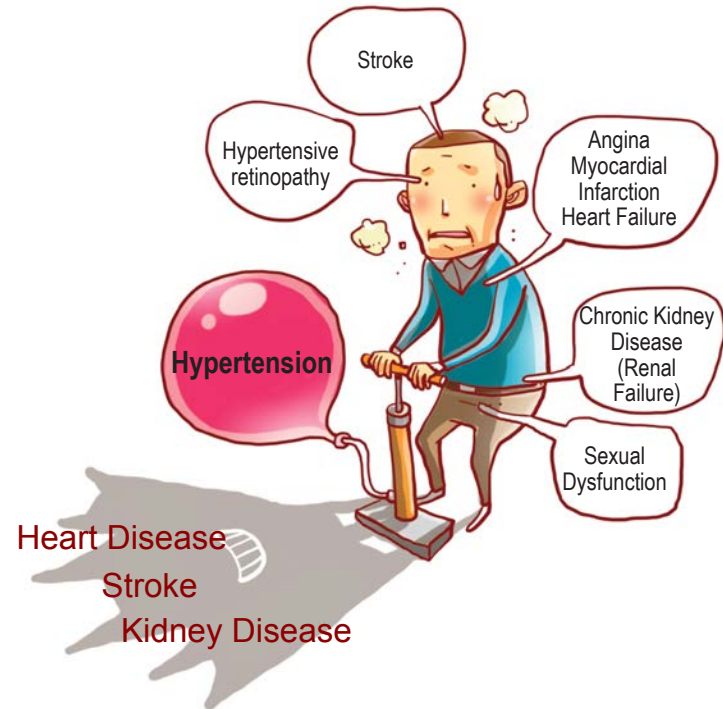




# Complications – overview (1)

## Patient education

- High blood pressure causes severe vessel-related complications if not properly controlled.
- Narrower and less flexible vessels cause atherosclerosis.
- If the aorta dilates, it can cause an aortic aneurysm, or even aortic dissection. If coronary arteries are suddenly blocked or narrowed, angina results.
- Heart failure occurs when the function of the heart deteriorates.
- Stroke or even vascular dementia are caused by cerebral vascular ischaemia. If kidney function deteriorates, it can lead to chronic kidney disease.
- Moreover, you could lose your eyesight from retinopathic disease and even suffer sexual dysfunction.



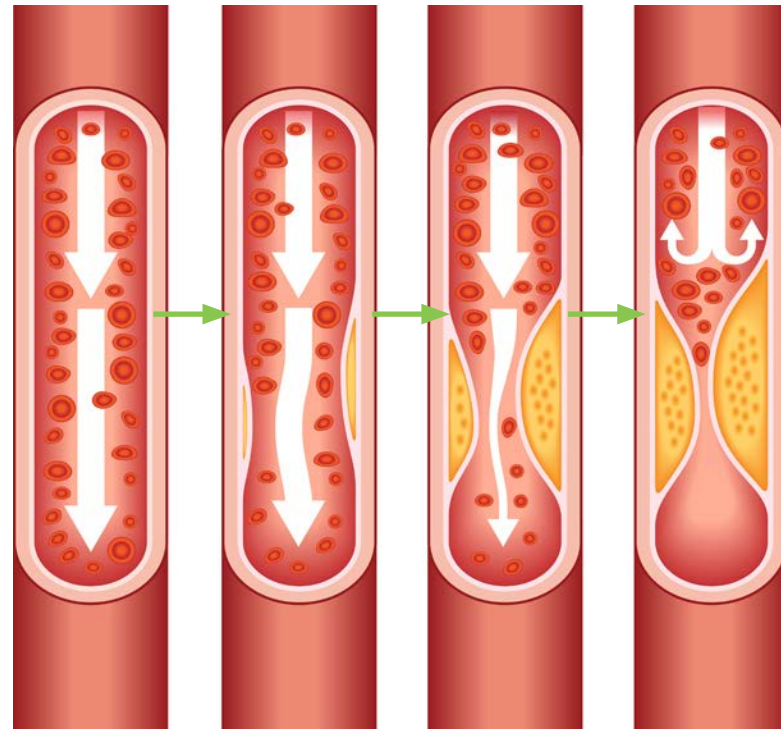
### REFERENCES:

Weber, Michael A., et al. Clinical practice guidelines for the management of hypertension in the community. *The Journal of Clinical Hypertension*, 2014, 16.1: 14-26.  
 National Institutes of Health, and National Heart, Lung, and Blood Institute (United States). *Your guide to lowering blood pressure*. NIH publication, 2003, 03-5232.  
 Chobanian, Aram V., et al. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. *Hypertension*, 2003, 42.6: 1206-1252.

## Complications – overview (2)

### Atherosclerosis

- A disease where an artery wall thickens as a result of accumulation of fibrofatty plaques.
- The disease can cause cerebral haemorrhage, cerebral ischaemia, vascular dementia, angina and myocardial infarction.



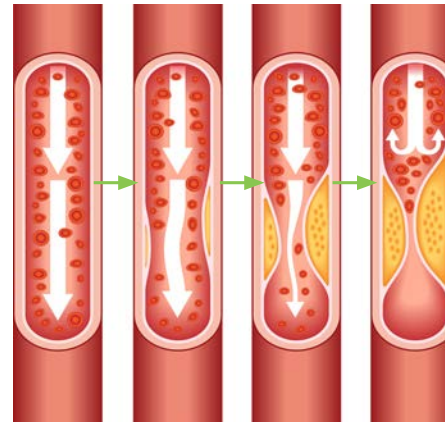
## Complications – overview (2)

### Patient education

- Hypertension causes severe problems within the blood vessels. When blood pressure spikes it damages the vessel wall, which leads to wall thickening and fat accumulation.
- This leads to angina, myocardial infarction, heart failure and kidney failure by decreasing the blood flow to the heart, brain, kidneys and extremities.

#### Atherosclerosis

- A disease where an artery wall thickens as a result of accumulation of fibrofatty plaques.
- The disease can cause cerebral haemorrhage, cerebral ischaemia, vascular dementia, angina and myocardial infarction.



#### REFERENCES:

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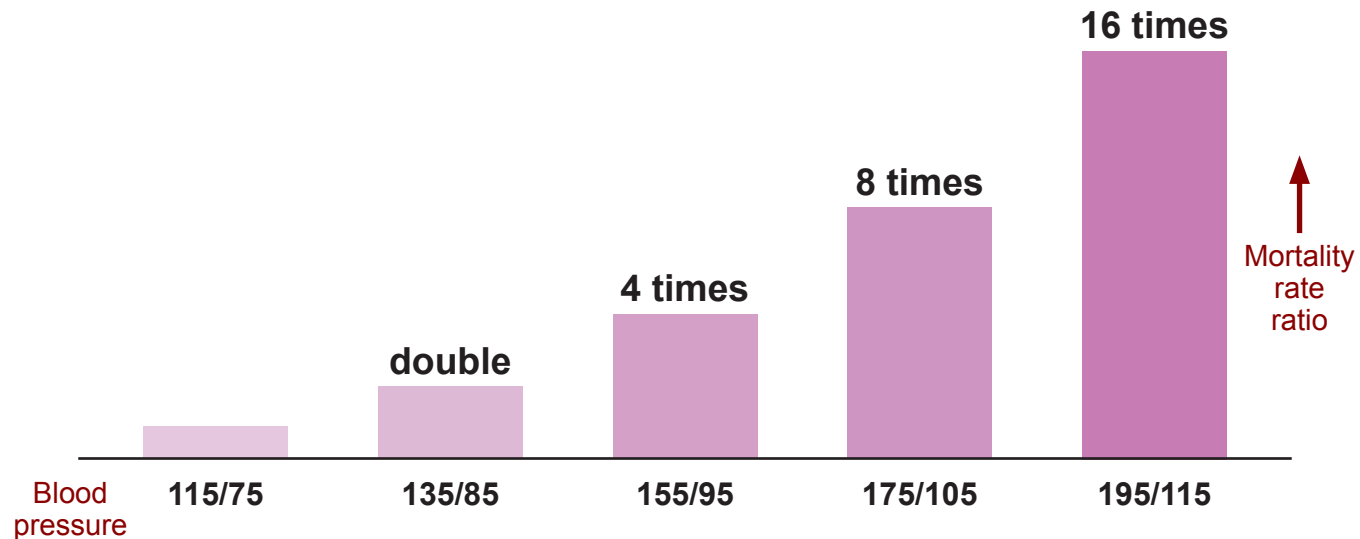
James, Paul A., et al. 2014 Evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). JAMA, 2014, 311.5: 507-520.

U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute. Your guide to lowering your blood pressure with DASH. DASH eating plan, 2006.

## Complications – overview (3)

### Cardiovascular disease

- Mortality rate from cardiovascular diseases increases as blood pressure rises.



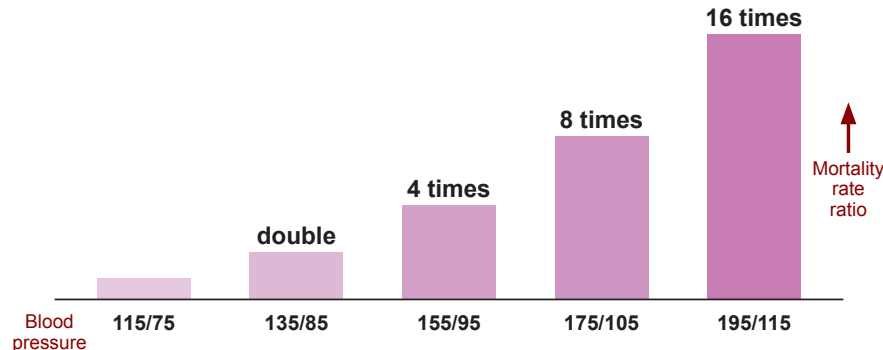
# Complications – overview (3)

## Patient education

- Mortality rate from cardiovascular disease increases as blood pressure rises.
- The graph below shows blood pressure over 155/95 mmHg which results in a risk of death from heart disease that is four times normal, eight times normal at 175/105 and 16 times normal at 195/115.

### Cardiovascular disease

- Mortality rate from cardiovascular diseases increases as blood pressure rises.



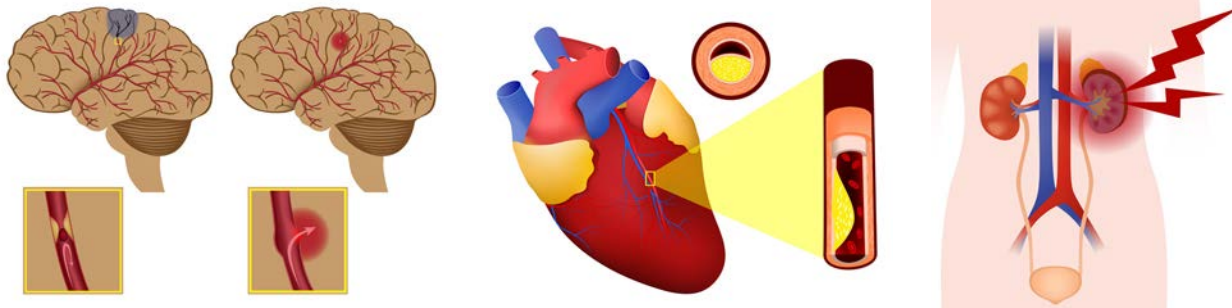
#### REFERENCE:

Prospective Studies Collaboration. Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies. The Lancet, 2002, 360.9349: 1903-1913.

# Importance of blood pressure control: complication prevention

By controlling blood pressure:

Cut the risk of {  
stroke by 30%  
myocardial infarction by 25%  
chronic kidney diseases by 23%



# Importance of blood pressure control: complication prevention

## Patient education

- Patients with hypertension often skip their medication or regular check-ups because they have no symptoms. If hypertension is neglected, it can lead to more severe diseases or complications, such as stroke, myocardial infarction and chronic kidney disease.
- Continuous blood pressure control is recommended to prevent these complications.

By controlling blood pressure:

Cut the risk of {
 

- stroke by 30%
- myocardial infarction by 25%
- chronic kidney diseases by 23%



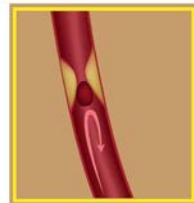
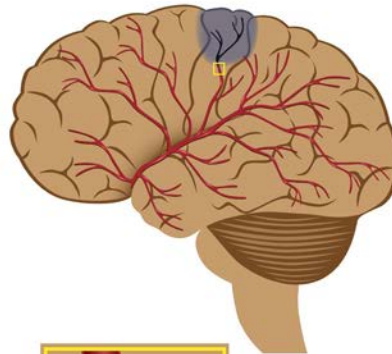
REFERENCES:

Hypertension basic theory course. Centers for Disease Control and Prevention, Republic of Korea. 2016. ([http://www.kncd.org/down/sub09/01/9\\_1\\_1\\_1.pdf](http://www.kncd.org/down/sub09/01/9_1_1_1.pdf), accessed 28 September 2016).  
 Haroun, Melanie K., et al. Risk factors for chronic kidney disease: a prospective study of 23,534 men and women in Washington County, Maryland. *Journal of the American Society of Nephrology*, 2003, 14.11: 2934-2941.

# Complications: stroke

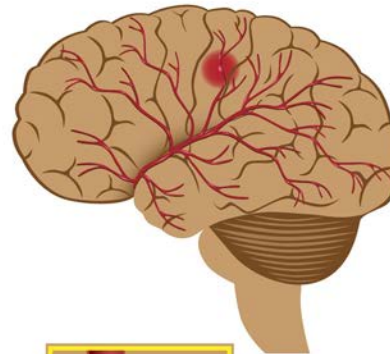
## Stroke

Ischaemic stroke



Blockage of blood vessels;  
lack of blood flow to affected area

Haemorrhagic stroke



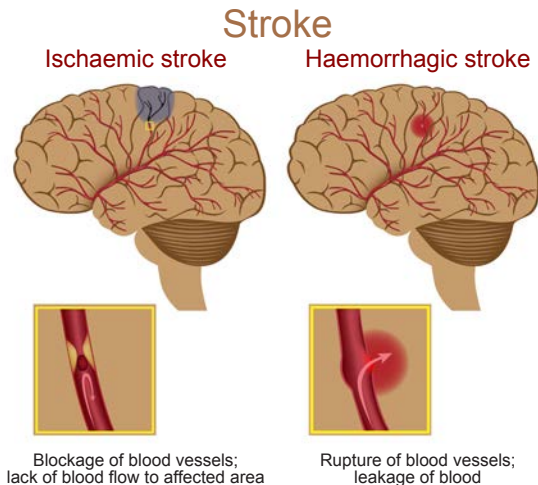
Rupture of blood vessels;  
leakage of blood



# Complications: stroke

## Patient education

- Stroke is a cerebrovascular disease that is caused when spontaneous vascular bleeding occurs (cerebral haemorrhage) or when the blood vessels are blocked.
- You are likely to lose consciousness and it may lead to paralysis.



### REFERENCES:

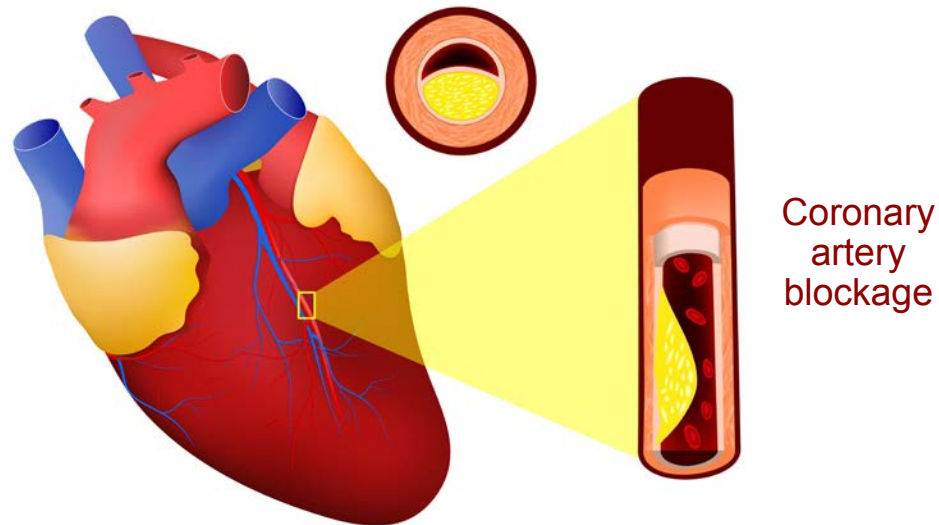
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 Chobanian, Aram V., et al. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension, 2003, 42.6: 1206-1252.

## Professional information

- The incidence rate of cerebral haemorrhage increases 4.3-fold when blood pressure is over 160/100 mmHg.
- If the patient has one of the symptoms below, it is vital that a local emergency number is called or the patient goes to the hospital.
- Treatment within three hours of onset of the following symptoms is often critical:
  - Sudden weakness or numbness in face, hand, legs or any part of the body;
  - sudden difficulty in speaking or feeling confused;
  - sudden loss of vision;
  - difficulty walking, dizziness, or poor sense of direction; and
  - sudden onset of severe headache without reason.

# Complications: myocardial infarction

## Myocardial infarction

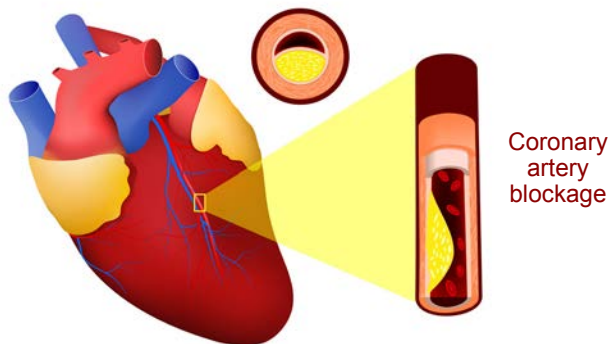


# Complications: myocardial infarction

## Patient education

- Hypertension causes myocardial infarction and heart failure.
- Myocardial infarction, commonly known as a heart attack, occurs when the heart does not contract properly due to the blockage of vessels supplying the heart muscle.
- Heart failure means not enough blood is being supplied to the body due to the deterioration of heart function.

### Myocardial infarction



## Professional information

- When blood pressure is not controlled, the incidence of myocardial infarction triples and heart failure quadruples.
- If a patient exhibits any of the following, they should seek medical attention immediately:
  - Chest discomfort, pressure in the chest or pain in the sternal area which continues for several minutes.
  - Radiating pain to the shoulder, neck or arm.
  - Dizziness, difficulty breathing, fever or nausea with chest pain.

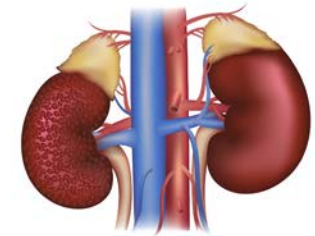
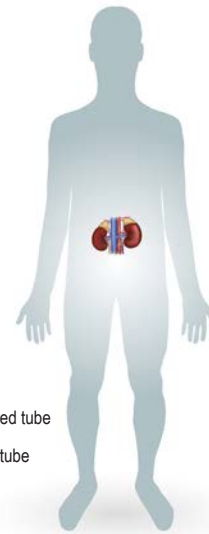
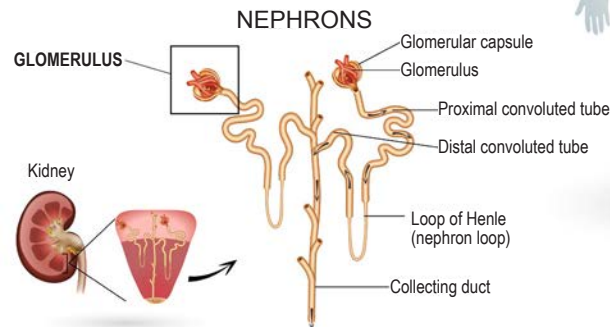
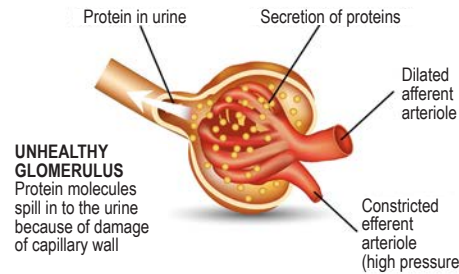
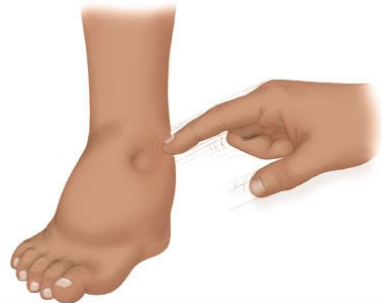
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 Chobanian, Aram V., et al. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension, 2003, 42.6: 1206-1252.

# Complications: chronic kidney disease

## Progress of chronic kidney disease (renal failure)

- Proteinuria
- Oedema, anaemia
- Increase in blood pressure
- Deterioration to hypertensive nephropathy
- Dialysis, kidney transplant



**NORMAL KIDNEY**



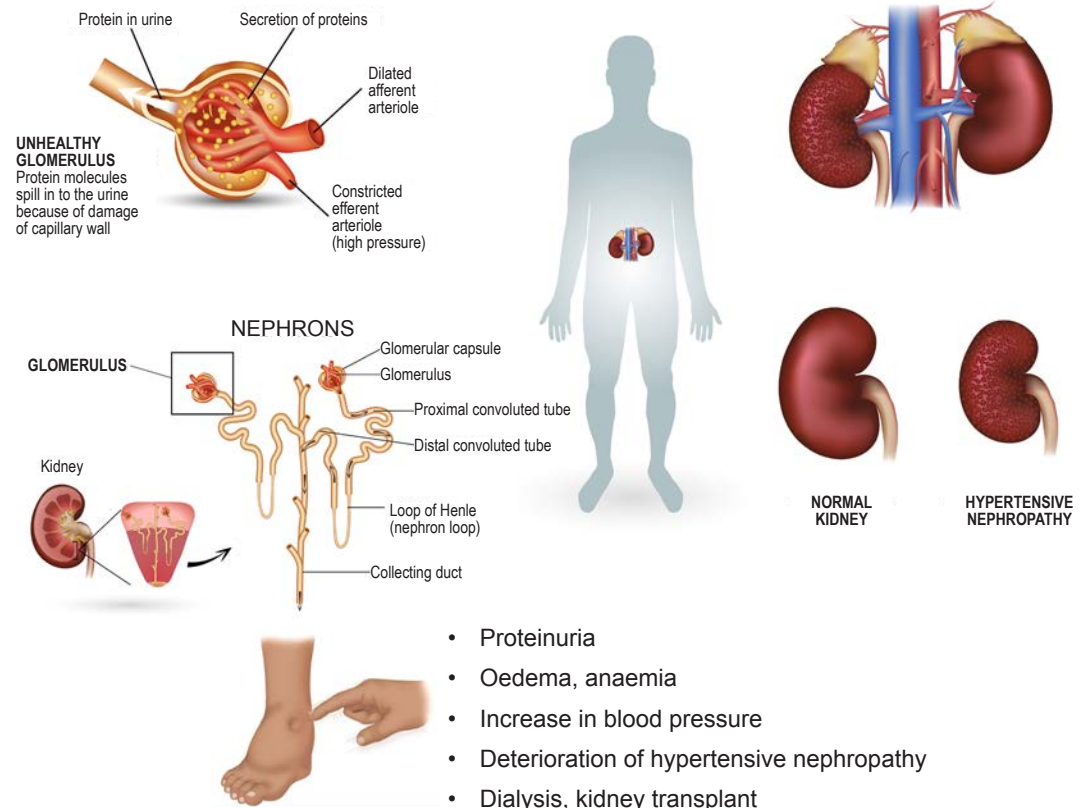
**HYPERTENSIVE NEPHROPATHY**

# Complications: chronic kidney disease

## Patient education

- Renal failure is one of the complications resulting from hypertension.
- When the renal capillaries are exposed to high blood pressure for a long time, they are damaged and become less efficient at filtering waste.
- In the early stage, proteinuria is detected.
- Later on, anaemia and oedema could occur.
- If renal function gets worse, dialysis or a kidney transplant may be needed.

### Progress of chronic kidney disease (renal failure)



- Proteinuria
- Oedema, anaemia
- Increase in blood pressure
- Deterioration of hypertensive nephropathy
- Dialysis, kidney transplant

REFERENCE:

Chobanian, Aram V., et al. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. *Hypertension*, 2003, 42.6: 1206-1252.

# Hypertensive emergency

## Red flag signs

- Severe headache and loss of consciousness
- Chest pain
- Nausea and vomiting
- Dizziness
- Visual disturbance
- Racing heartbeat



# Hypertensive emergency

## Patient education

- If your blood pressure is over 180/120 mmHg, it is an emergency that could cause severe complications, such as cerebral haemorrhage, acute myocardial infarction, angina, aortic dissection, or kidney disease.
- If you have warning signs, including severe headache with loss of consciousness, chest pain, nausea and vomiting, dizziness, visual dysfunction, tachycardia or seizure, you need urgent treatment for suspected hypertensive emergency.

### Red flag signs

- Severe headache and loss of consciousness
- Chest pain
- Nausea and vomiting
- Dizziness
- Visual disturbance
- Racing heartbeat



#### REFERENCE:

Grassi D. et al., Hypertensive urgencies in emergency department: evaluating blood pressure response to rest and to antihypertensive drugs with different profiles. J Clin Hypertens, 2008, 10(9): 662-7.

## In case of emergency

- Do not delay calling the local emergency number and going to the hospital.
- Loosen tight clothes around body and chest.
- If you vomit, turn your face to the side to protect the airway.





# In case of emergency

## Patient education

- If there is an emergency, do not delay calling the local emergency number.
- You should stop all activities and rest with your head in an upper position.
- Tight clothes should be loosened.
- If you vomit, turn to the side and remove food with your hand so that the food or tongue does not block the airway.

- Do not delay calling the local emergency number and going to the hospital.
- Loosen tight clothes around body and chest.
- If you vomit, turn your face to the side to protect the airway.



### REFERENCE:

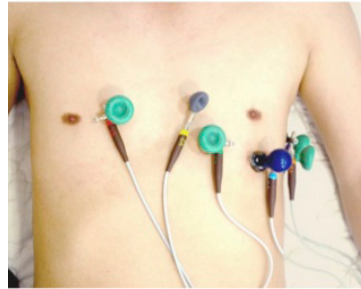
Grassi D. et al., Hypertensive urgencies in emergency department: evaluating blood pressure response to rest and to antihypertensive drugs with different profiles. J Clin Hypertens, 2008, 10(9): 662-7.

# Regular check-ups for hypertension

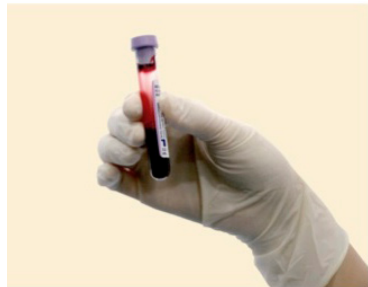
Measuring blood pressure



Electrocardiogram test (if available)



Blood glucose test (if available)



Urinalysis (if available, urine dipstick)



# Regular check-ups for hypertension

## Patient education

- It is important to maintain a healthy lifestyle, visit the hospital regularly and take medication continuously to prevent complications.
- Regular check-ups are also needed to prevent complications.
- Annual blood and urine tests should be done, as well as regular tests to detect any damage to eyes, heart or kidneys.



Measuring blood pressure



Electrocardiogram test (if available)



Blood glucose test (if available)



Urinalysis (if available, urine dipstick)

## Professional information

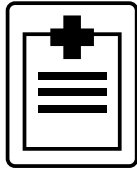
Routine tests for hypertension:

- Haemoglobin/haematocrit, sodium, potassium, glomerular filtration rate, uric acid
- Fasting blood glucose, fasting lipid profile
- Liver function test
- Urine analysis (proteinuria, haematuria, albumin/creatinine ratio)
- 12 lead electrocardiogram

### REFERENCE:

Weber, Michael A., et al. Clinical practice guidelines for the management of hypertension in the community. The Journal of Clinical Hypertension, 2014, 16.1: 14-26.

## Possible causes of uncontrolled blood pressure



Non-adherence to prescribed medicine



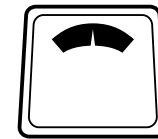
Taking other medicines that can interfere with your hypertension treatment (nonsteroidal anti-inflammatory drugs, steroids, oral contraceptives, etc.)



Excessive salt intake



Binge drinking or otherwise harmful use of alcohol



Sudden weight gain and sleep apnoea

# Possible causes of uncontrolled blood pressure

## Patient education

- When blood pressure is not maintained below 140/90 mmHg, you should consult your doctor.
- Common reasons include, wrong blood pressure measurement, lifestyle problems (obesity, excessive alcohol intake and sleep apnoea), excessive body fluid due to high salt intake, poor adherence to prescribed medicine, inappropriate prescription and drug interaction (nonsteroidal anti-inflammatory drugs, steroids and oral contraceptives).



Non-adherence to prescribed medicine



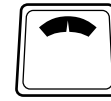
Taking other medicines that can interfere with your hypertension treatment (nonsteroidal anti-inflammatory drugs, steroids, oral contraceptives, etc.)



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# Take-home message

## Complication prevention

### When blood pressure is controlled:

- Risk of complications (stroke, myocardial infarction, chronic kidney disease) decreases.
- Mortality rate from complications decreases.

### To manage blood pressure properly

- **Detection of complications** is achieved by regular check-ups, including blood pressure measurement, blood and urine testing and electrocardiogram exam.





