



## Nurses and Diseases of the Heart and Blood Vessels

Siniša Franjić<sup>1\*</sup>

<sup>1</sup>Independent Researcher

<p><b>Abstract:</b> Cardiology is a branch of medicine that deals with disorders of the heart as well as some parts of the circulatory system. The field includes medical diagnosis and treatment of congenital heart defects, coronary artery disease, heart failure, valvular heart disease and electrophysiology. Nurses play an extremely important role in the treatment and health care of cardiac patients. This paper is dedicated to them.</p> <p><b>Keywords:</b> Cardiology, Nurse, Heart Failure, Blood Pressure, Health.</p>	<p align="center"><b>Review Paper</b></p>
	<p align="center"><b>*Corresponding Author:</b> <i>Siniša Franjić</i> Independent Researcher</p>
	<p align="center"><b>How to cite this paper:</b> Siniša Franjić (2024). Nurses and Diseases of the Heart and Blood Vessels. <i>Middle East Res J Nursing</i>, 4(3): 24-29.</p>
	<p align="center"><b>Article History:</b>   Submit: 11.05.2024     Accepted: 12.06.2024     Published: 15.06.2024  </p>
<p><b>Copyright © 2024 The Author(s):</b> This is an open-access article distributed under the terms of the Creative Commons Attribution <b>4.0 International License (CC BY-NC 4.0)</b> which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.</p>	

### INTRODUCTION

Getting an precise evaluation of chest pain is an critical viewpoint of separating cardiac chest pain from other sources of pain (eg, musculoskeletal, respiratory, uneasiness) [1]. Ischemic chest pain, caused by need of oxygen to the myocardium, must be rapidly recognized for helpful mediations to be viable. The foremost critical descriptors of ischemic pain incorporate antecedents of pain onset, quality of the pain, pain radiation, seriousness of the pain, what calms the pain, and timing of onset of the current scene of pain that brought the quiet to the healing center. Each of these descriptors can be evaluated utilizing the "PQRST" nomogram. This nomogram prompts the clinician to inquire a series of questions to assist recognize the characteristics of the chest pain.

Coronary angiography could be a common and successful strategy for visualizing the life structures and patency of the coronary arteries. This procedure, also known as cardiac catheterization, is utilized to analyze atherosclerotic injuries or thrombus within the coronary vessels. Cardiac catheterization is additionally utilized for assessment of valvular heart disease, counting stenosis or inadequate, atrial or ventricular septal absconds, inherent irregularities, and cardiac wall movement variations from the norm.

Chest pain could be a common indication which happens in individuals of all generations [2]. It is the foremost common cause of crisis participation in men, while women in moment put instantly after stomach pain. Some of the causes of chest pain are banal and safe, and go without treatment or with less intercession. On

the other hand, a few of the foremost genuine ailments in medication are displayed fair within the chest pains. Chest pain may show serious health issues, so it is fitting to quickly visit a doctor who will set the determination or allude the persistent to assist treatment.

### Cardiovascular Status

Survey cardiovascular function by taking crucial signs, observing electrocardiogram rate and rhythm, and watching skin color and condition [3]. Compare blood weight discoveries with pattern information from the preoperative period. Temporal hypertension can happen as a result of anesthetic impacts, respiratory lacking, the surgical procedure, or the fervor stage of recuperation from anesthesia.

Hypotension may be the result of shifted components, counting preoperative drugs, anesthetic specialists, position changes, blood misfortune, respiratory changes, and fringe blood pooling. Oxygen organization, profound breathing, leg exercises, verbal incitement (to assist remove anesthetic gasses and encourage expanding level of awareness), and keeping up or expanding IV liquid organization rates can raise low blood pressure.

Patients are at hazard for changed body temperature related to the surgical method, its length, anesthetic operators, a cool surgical environment, age, and utilize of cool watering or implantation liquids. Accidental hypothermia (temperature below 36.8°C [96.8°F]) can lead to complications of destitute wound mending, hemodynamic push, cardiac unsettling influences, coagulopathy, deferred rise from anesthesia,

and shuddering with its related distress. Routinely degree the patient's center body temperature utilizing an invasive/noninvasive gadget, or assess center body temperature with fringe estimation (oral/axilla/rectum) employing a thermometer or test. Note that current rules don't suggest infrared strategies, such as tympanic layer estimation, for the perioperative understanding. In case the persistent is hypothermic, warmed covers put on the patient's body and constrained warm-air gadgets are utilized for rewarming.

Survey all beats for two-sided equality, rhythm, rate, and character. Of extraordinary centrality are appraisals of abnormal function an unpredictable beat, nonappearance of beats, or tachycardia. Carefully assess for tachycardia, an early side effect of shock. Other related evaluations for stun are a diminishing blood pressure, cyanosis, a cool skin temperature, and a diminish in urine output. After surgery on an limit, closely screen beat checks, neurologic checks, color, temperature, and sensation.

### Changes

The cardiovascular framework is composed of the heart and the blood vessels, and it is unfavorably influenced in ageing [4]. It is imperative to get it that the cardiovascular framework has impressive save capacity. In other words, solid more seasoned individuals can adapt to the changes within the cardiovascular framework, and the impacts of maturing are as it were clear on the off chance that the framework is challenged. For illustration, running to capture a transport will for the most part be harder for somebody as they age, but going about the typical exercises of way of life will not be affected. The impacts of ageing on the cardiovascular system are triple: misfortune of versatility within the vessels of the framework, the atherosclerotic changes within the dividers of the courses and the effects of ageing on the cardiac muscle. The misfortune of versatility within the vessels of the cardiovascular framework arise from ageing changes in the proteins that constitute the blood vessels. This misfortune of elasticity means that the system cannot adjust as quickly as we age and, so, cannot oblige changes in blood pressure as well as when we are more youthful. Within the arteries, typically compounded by the atherosclerotic changes within the vessels whereby greasy stores gather within the dividers of the supply routes, and calcium moreover gathers making the dividers of the supply routes hardened. The heart may be a muscle and all muscles age, but getting to be decayed and, subsequently, weaker which implies that blood isn't circulated as proficiently with age, and the heart gets to be less able to adjust to the changing needs of the body, particularly when the blood circulation ought to be expanded.

As a result of ageing, the working of the cardiovascular framework gets to be less productive [5]. Diminished flexibility of the heart muscle and courses

causes a consequent increment in systolic blood weight. Expanded fat stores within the blood vessels lead to a diminished supply of oxygen. The blood vessel breadth diminishes since of arteriosclerosis. Thickening of venous dividers leads to diminished versatility. Thickening of aortic and mitral valves leads to fragmented closure; heart mumbles may happen in a few more seasoned individuals. The advancement of varicose veins is common. As a result of diminished cardiac yield, numerous more seasoned individuals involvement a diminished capacity for physical action.

Educated the individual almost the significance of remaining physically active and the have to be adjust movement with satisfactory rest and rest. More seasoned grown-ups moreover require data on way of life adjustments that advance cardiovascular health. Such instruction would incorporate the taking after:

- Avoid smoking and the utilize of other shapes of tobacco
- Avoid secondary tobacco smoke
- Eat a healthy diet (low in fat, low in cholesterol)
- If shortness of breath or chest pain is experienced during exertion, it is critical to let their specialist know (this is often not essentially an acknowledged portion of getting ancient)
- Avoid a stationary way of life, which can result in impeded cardiac yield with resultant weakness.

### Catheterization

Prior to cardiac catheterization, the patient is kept NPO (nothing by mouth) for at slightest 6 hours, to play down the hazard of desire within the occasion that crisis intubation is required amid the strategy [1]. NPO may demonstrate everything but medications, which are taken with little tastes of water on the day of the strategy. Typically, if the patient is on affront or taking verbal hypoglycemics, the dosages may ought to be balanced or held the day of the strategy. There are other solutions which will ought to be held. Benadryl may be managed earlier to starting the method as a preparatory degree against unfavorably susceptible response to the color. Unfractionated heparin and platelet inhibitor operators (counting ibuprofen, glycoprotein IIb/IIIa receptor inhibitors, and/or clopidogrel) may be managed to anticipate catheter-induced platelet accumulation amid the method. Regularly, patients stay wakeful amid the strategy, permitting them to encourage the catheterization handle by controlling respiratory designs (eg, breath holding amid infusion of radiopaque color to move forward the quality of the picture). An anxiolytic operator, such as diazepam, is habitually managed amid the method to diminish uneasiness or anxiety.

An intracoronary catheter is embedded through a "sheath" or vascular introducer set in a huge artery, the femoral artery, or the outspread artery. In case embedded

by means of the femoral artery, the catheter is at that point progressed into the climbing stomach aorta, over the aortic arch, and into the coronary supply route hole found at the base of the aorta. In the event that embedded through the spiral supply route, the catheter is at that point progressed into the brachial course, through the subclavian artery, over the aorta, and into the coronary supply route hole found at the base of the aorta.

There are stars and cons to transfemoral approach and the spiral approach. The femoral approach has the next chance of bleeding, longer clinic remain, chance of pseudoaneurysm, and clot arrangement. Moreover, the femoral artery is the sole source of blood to the leg. With the outspread approach, there are less prepared suppliers, littler blood vessel breadth, a longer strategy time, hazard of fistula, and serious vasospasm. With either approach, during the method ionic color, obvious to the observer or administrator beneath fluoroscopy (x-ray), is at that point infused into the coronary blood vessel tree by the catheter. If the cardiac valves, septa, or ventricular divider movement is being assessed, the catheter is progressed specifically into the cleared out ventricle, taken after by infusion of color. During a right heart catheterization, the catheter is embedded into the venous framework through the femoral vein and progressed into the inferior vena cava, passed through the proper ventricle, and progressed into the aspiratory course.

### Systems

The coronary vascular tree comprises of a cleared out and a right system [1]. The cleared out framework comprises of two primary branches, the left anterior descending (LAD) course and the cleared out circumflex (LCx) supply route. The proper framework has one primary department, the right coronary artery (RCA). Both frameworks have a number of smaller vessels that department off these three primary blood vessel vessels. An obstacle of 75% or more in a major coronary course or one of its major branches is considered clinically noteworthy stenosis. In case there's noteworthy malady in as it were one of the major arteries, the persistent is said to have single-vessel infection. In case two major vessels are influenced, the understanding has two-vessel disease. In the event that significant disease exists in all three major coronary courses, at that point the quiet has three-vessel disease. Regularly, the microvasculature, or littler vessels branching off the major coronary course, may moreover have blockages. It is common to allude to these numerous injuries as diffuse disease.

A cineventriculogram is gotten by radiographic imaging during the infusion of color after progressing the catheter from the aorta, through the aortic valve, and into the cleared out ventricle. The cineventriculogram gives data on ventricular divider movement, launch division, and the nearness and seriousness of mitral regurgitation

and aortic regurgitation. Launch division, or the rate of blood volume shot out from the cleared out ventricle with each contraction, is the gold standard for deciding cleared out ventricular work and is helpful in selecting treatment procedures. A cleared out ventricular discharge division (LVEF) ordinary esteem is 55% to 70%. The LVEF is one of the foremost vital predictors of long-term result taking after intense myocardial dead tissue (AMI). Patients with ejection divisions less than 20% have about 50% 1-year mortality. Another vital estimation is the weight within the cleared out ventricle at the conclusion of diastole. This is often called "left ventricular end-diastolic pressure (LVEDP)." It, as well, is an critical determinant of ventricular work and is considered to be a indicator of horribleness and mortality in patients with heart disappointment (HF) and those experiencing cardiac surgery. The ordinary LVEDP is 6 to 12 mm Hg.

### Examination

Cardiac assessment is a key portion of the administration of the intensely unwell patient [6]. During the ABCDE approach, this would be more summed up, unless a particular cardiovascular anomaly was identified. A more detailed cardiovascular evaluation ought to be carried out on the off chance that any modified pathology was found, which may give data to help clinical administration. In spite of the fact that innovations have progressed colossally over the a long time, clinical examination remains a central tool inside the evaluation prepare. As with all other body frameworks, the most components of cardiovascular appraisal are review, palpation, percussion and auscultation. There are particular highlights inside the cardiac appraisal that can offer assistance with differential diagnosis. Within the intensely unwell patient, cyanosis, paleness and diaphoresis can all be signs of approaching catastrophe.

Understanding the cardiac cycle can give you an sign of any variations from the norm inside the heart.

- Atrial systole: contributes to the last ~ 15-20% of the ultimate ventricular volume. End-diastolic pressure (EDP) <10 mmHg, and is higher within the cleared out ventricle than within the right due to the thicker and so stiffer cleared out ventricular divider.
- Ventricular systole: ventricular pressure rises strongly amid compression. AV valves near as before long as this can be more noteworthy than the atrial pressure. Comes about in to begin with heart sound (S1).
- Ejection: ventricular pressure surpasses that within the aorta or pulmonary artery. The outpouring valves open and blood is catapulted. Stream briefly inverts, causing closure of the outpouring valve. There's a little increment in aortic pressure (dicrotic notch) coming about within the second heart sound (S2).

- Diastole: quickly after closure of the outpouring valves, the ventricles quickly unwind. This stage is twice the length of systole at rest, but diminishes as the heart rate increments.

### Thrombus Formation

Intracoronary thrombus formation, and the coming about hindrance of coronary blood stream, is the pathophysiologic component of intense ischemic heart infection [1]. Preexisting atherosclerosis and fit of the smooth muscle divider of the coronary supply routes, named settled obstacles, may also contribute to diminished stream. In a few circumstances, coronary supply route fit may play a major part, disconnected to basic atherosclerosis, causing MI (myocardial infarction). These events are in some cases related with cocaine utilize seen in MI in youthful patients.

Thrombus arrangement within the coronary arteries starts with the fissuring and burst of atherosclerotic plaque within the vessel divider of the coronary artery. A nonstop, energetic prepare happens whereby plaque may gotten to be unsteady amid periods of dynamic collection of more lipid into the center of the plaque. The plaque at that point bursts, scattering its substance into the lumen of the coronary supply route and causing enactment of clotting variables at the location of plaque burst. The break of plaque and resultant thrombus arrangement may eventually occlude the coronary artery.

In spite of the fact that most individuals have a few degree of atherosclerotic plaque arrangement by age 30, the tremendous lion's share of these plaques are considered "stable." The smooth stringy caps that cover these plaques permit adequate blood flow through the coronary supply routes, and are not inclined to improvement of unsteady angina or MI. In youthful, developing plaques, the sinewy cap may gotten to be lean and crack, coming about in unsteady angina, ischemia, or MI.

### Plaque

Clinical evaluation, push testing, and indeed cardiac catheterization don't give data around the substance of the plaque and thus identification of the chance of rupture is challenging [1]. Plaque break may be caused by a number of natural or hormonal variables, known as triggers. These triggers may disturb the plaque and accelerate an acute coronary occasion. A few of the triggers for atherosclerotic plaque crack can be controlled or controlled, such as blood pressure (BP), blood glucose level, and push. Within the clinical setting, administration of these factors may diminish the chance for AMI, reinfarction, and reocclusion. They are closely observed.

When these triggers combine to cause plaque rupture, the lipid pool is uncovered and a harsh surface

on the intima of the vessel divider happens, invigorating the nearby impacts of hormonal and safe components and initiating thrombus formation. At the same time, the fibrinolytic framework is fortified, making a energetic prepare of concurrent endeavors to make and break down the clot. Since of the energetic nature of the clotting handle, the thrombus may be totally or only partially obstructive, or may change discontinuously between the two stages. Regardless of the development of the clot, the handle of thrombus arrangement may lead to obstacle of blood stream, lessening oxygen conveyance to distal myocardium and making a jumble between the supply of and request for oxygen.

Since the fundamental pathology of the ischemia-related analyze is the same (plaque rupture and thrombus formation), ischemic heart infection includes the whole range of coronary occasions that are alluded to as ACS (acute coronary syndrome). ACS speaks to a continuum of clinical occasions that will result from the supply-demand jumble counting unsteady angina, non-ST-segment elevation myocardial infarction (NSTEMI), or ST-segment elevation myocardial infarction (STEMI).

### Heart Failure

Heart failure could be a wide term alluding to the failure of the heart to preserve an satisfactory cardiac yield to meet the oxygen and metabolic prerequisites of the body [1]. The impedance may be due to either left ventricular brokenness or right ventricular brokenness. In a few cases, both chambers are disabled, alluded to as biventricular failure. A number of clutters contribute to the improvement of HF. Coronary atherosclerosis, valvular heart illness, hypertension, and cardiomyopathy are the foremost common causes.

Cleared out ventricular failure is more common than right ventricular failure. Be that as it may, intrigued in right ventricular failure has expanded since of progresses within the administration of aspiratory hypertension, made strides symptomatic innovations, and expanded implantation of cleared out ventricular assist devices and other mechanical assist devices for cardiogenic stun. Administration of right ventricular failure is coordinated toward the essential cause with a center on right ventricular preload, afterload, and myocardial contractility. When medical management is not adequate, right ventricular mechanical circulatory back may be executed.

### Shock

Shock is the inability of the circulatory framework to convey sufficient blood to meet the oxygen and metabolic prerequisites of body tissues [1]. This clinical disorder may result from incapable pumping of the heart (cardiogenic shock), deficiently volume of circulating blood (hypovolemic shock), or enormous vasodilation of the vascular bed causing maldistribution of blood (distributive shock). In spite of the fact that



procedures for persistent administration change agreeing to the basic pathophysiology, the essential definition of stunned as incapable or insufficient oxygen conveyance to meet wants of body tissues remains steady.

### Hypertension

Hypertension is ordinarily a chronic disease of BP rise that's regularly conceal, particularly within the early years of onset, appearing few or no signs or side effects [1]. Hypertensive emergency is an intense scene or compounding, happening rarely in a little rate of hypertensive patients and which may have a urgent impact on the patient's long-term result. In most cases, the numerical or supreme esteem of the arterial BP is less vital than its affect on the individual's fundamental hazard of target organ harm, particularly cerebrovascular, coronary, and renal illnesses.

High blood pressure or hypertension is, in common, a symptom-free condition where strangely tall blood weight within the arteries increments the chance of creating issues such as stroke, aneurysm, heart failure, heart assault, and kidney harm [7]. For most individuals the word hypertension implies intemperate pressure, apprehension or stress. In medication, the term hypertension shows the condition of tall blood pressure notwithstanding of the cause. Tall blood weight is additionally called a "silent killer" since it as a rule does not cause side effects for a long time until it causes harm to vital organs. When measuring blood weight, two values are recorded. The upper esteem speaks to the minute when the heart sticks (systole); whereas the lower esteem happens during the relaxation of the heart between two stroke (diastole).

Hypertension influences roughly 75 million people within the United States and roughly 1 billion individuals around the world, assigning it as the foremost common infection state [8].

Hypertension may be a major chance calculate for coronary course infection, cardiovascular disease (CVD), and passing coming about from cardiovascular causes. It is the foremost vital chance figure for stroke and heart failure, and it is additionally a major hazard calculate for renal failure and fringe vascular infection. There's unquestionable prove with respect to the relationship between blood weight and chance for CVD; the higher the blood pressure, the more noteworthy the chance of creating CVD. For individuals 40 to 70 years of age, the chance for creating CVD copies with each 20 mm Hg increase in SBP or 10 mm Hg increase in DBP.

Blood pressure is decided by the item of cardiac output (4 to 8 L/min) and systemic vascular resistance (SVR). Cardiac output is the sum of blood that's shot out from the cleared out ventricle and is measured in liters per diminutive. SVR is the resistance to blood stream that's decided by the distance across of the blood vessel and the vascular musculature. Various components

connected to control these two major factors and keep the blood pressure inside typical limits.

Hypertension also can be characterized by its cause. When the particular cause of hypertension is obscure, it may be called basic hypertension (or idiopathic or essential hypertension). Around 90% of cases of hypertension are of this sort. Secondary hypertension accounts for the leftover portion. Secondary hypertension is most commonly the result of another disease such as pheochromocytoma (adrenal tumor), preeclampsia of pregnancy (a pregnancy complication including intense hypertension, among other indications), renal artery disease, sleep apnea, thyroid illness, or parathyroid disease. It may also result from the utilize of certain medications. In case the cause of secondary hypertension can be disposed of, blood pressure more often than not returns to ordinary. In case untreated, hypertension can cause harm to end organs such as the heart, brain, kidneys, and eyes.

The objective of antihypertensive treatment is the lessening of cardiovascular and renal dreariness and mortality. Concurring to the JNC 8 (Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure), treatment ought to be begun in the event that blood pressure is at or more noteworthy than 150/90 mm Hg for patients older than 60 years of age and 140/90 mm Hg for patients more youthful than 60 and those who have inveterate kidney illness or diabetes.

Noteworthy propels have been made in both the ways to treat hypertension and within the understanding of the disease prepare. Large numbers of clinical trials have appeared that enough treating hypertension can prevent or delay CVD. Over the past 40 years, the advancement of modern antihypertensive drugs has had an colossal affect on the quality of life of individuals with hypertension. Sedate treatment for hypertension first got to be accessible within the early 1950s with the presentation of ganglionic-blocking drugs. In any case, repulsive adverse effects and conflicting helpful impacts were common issues with these antihypertensive drugs. In 1953, the vasodilator hydralazine was presented, and in 1958 the thiazide diuretics got to be accessible. Since that time, a few extra sedate classes have been created.

## CONCLUSION

Diseases of the heart and blood vessels are the most common diseases today and the most common cause of disability and death of people, preventive examinations, implementation of early diagnostic methods and adequate treatment are of crucial importance for the prognosis of patients suffering from blood vessel and heart diseases. Diseases of the heart and blood vessels can be divided into endocardial diseases, myocardial diseases, pericardial diseases, heart

disorders, heart valve defects, heart failure and blood vessel diseases. Prevention, timely diagnosis and adequate treatment are of great importance.

## REFERENCES

1. Powell, B., & Leeper, B. (2024). „Cardiovascular System“ in Delgado, S. (ed): „AACN Essentials of Progressive Care Nursing, Fifth Edition“, McGraw Hill LLC, New York, USA, pp. 219-247.
2. Sinisa, F. (2019). Chest Pain Is Not Banal Health Problem. *CPQ Medicine*, 6(3), 01-06.
3. Taylor, C., Lynn, P., & Bartlett, J. L. (2023). „Fundamentals of Nursing - The Art and Science of Person-Centered Care, Tenth Edition“, Wolters Kluwer, Philadelphia, USA, pp. 1403.
4. Watson, R. (2021). „Understanding Ageing for Nurses and Therapists“ in McSherry, W., Rykkje, L., & Thornton, S. (eds). „Understanding Ageing for Nurses and Therapists“, Springer Nature Switzerland AG, Cham, Switzerland, pp. 18.
5. DeLaune, S. C., Ladner, P. K., McTier, L., & Tollefson, J. (2024). „Fundamentals of Nursing - Australia & New Zealand, Third Edition“, Cengage Learning Australia Pty Limited, Southbank VIC, Australia, pp. 342.
6. Hill, B., & Fox, S. D. (eds). (2023). „Advanced Clinical Practice at a Glance“, John Wiley & Sons Ltd, Hoboken, USA, pp. 48.
7. Franjić, S. (2019). Hypertension Emergency. *Emerg Med Trauma Care J: EMT CJ-100006*.
8. Lilley, L. L., Collins, S. R., & Snyder, J. S. (2023). „Pharmacology and the Nursing Process, Tenth Anniversary Edition“, Elsevier, St. Louis, USA, pp. 336.