

Cardiovigilance

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Abstract

Cardiovascular disease (CVD) is a major cause of morbidity and mortality across the globe. Prevention and management of the CVD pandemic calls for concerted action on part of all health care professionals, as well as other concerned stakeholders. We call for cardiovigilance in healthcare and define it as "the action or state of keeping careful watch, to prevent, screen, diagnose and manage cardiovascular disease (CVD) in a timely and appropriate manner". We expand upon the concept of cardiovigilance, describe its utility, and suggest various taxonomic rubrics to simplify its practice.

Keywords: ASCVD, Angina equivalents, Cardiology, Diabetes, Preventive cardiology.

Salutovigilance

Vigilance is described as "the action or stage of keeping careful watch for possible danger or difficulties".¹ This noun reflects the ethics which all health care professionals profess: to carefully attend to the health of their fellow citizens. "Health vigilance" or "Salutovigilance" (salus [Latin] =health), therefore, can be defined as "the action or state of keeping careful watch for possible danger or difficulties related to health". Salutovigilance is broad concept, which encompasses both public and individual health, as well as preventive and clinical medicine.

Cardiovascular Disease

In today's world, the major cause of premature mortality is cardiovascular disease (CVD). Feared as "the greatest scourge affecting the industrialized nations," by Eugene Braunwald in 1980,² CVD has spread across the globe. Low- and middle-income countries, including South Asian nations, now experience a higher burden of CVD than high income countries.

CVD is the cause of 27% of all deaths in South Asia, with

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coronary heart disease (CHD) accounting for more than half these fatalities.³ Quality of life is impaired, as is economic productivity. The impact on economy is especially important, as South Asians seem to develop CHD 5-10 years earlier than their European and American counterparts. The clinical course of CVD in South Asians is characterized by multiple risk factors, rapid progression, frequent complications, and premature mortality.

Cardiovigilance

We therefore propose the concept of cardiovigilance as an integral part of good clinical practice. We define cardiovigilance as "the action or state of keeping careful watch, to prevent, screen, diagnose and manage cardiovascular disease (CVD) in a timely and appropriate manner". Cardiovigilance goes beyond theory, and is a concept of practical importance. It is of relevance not just to cardiologists, but to non-cardiologists as well. In this opinion piece, we amplify the concept of cardiovigilance from a clinical and public health perspective. We describe the action that health care professionals must take in order to ensure good cardiovascular health. Our concept includes prevention of CVD,⁴ but extends beyond this, to cover "good clinical sense"⁵ and practice as well.

The Taxonomy of Cardiovigilance

Cardiovigilance can be studied through various taxonomic rubrics (Table-1). The simplest would be to approach the topic from a clinical methods hierarchy. Vigilance while taking a history, conducting a general and systemic examination, and ordering rational investigations is ingrained in modern medical practice. Such a system appeals to all medical practitioners, and lends itself to universal use. Some examples of a clinically vigilant approach are listed in Table-2.

Yet another way of studying the subject is to link it with the levels of prevention.⁶ Vigilance, like prevention, can be primordial, primary, secondary or tertiary. Later on, in this article, we extrapolate the concept of quaternary prevention to cardiovigilance. Cardiovigilance can be taught using anatomical and etiophysiologic classification, or according to risk reduction/outcome prevention. The concept of cardiophenotype spectrum, detailed later on, explores this method of taxonomy

Table-1: Cardiovigilance: A schematic rubric.

A. According to clinical methods

- ◆ Vigilance in history taking
- ◆ Vigilance in general examination
- ◆ Vigilance in focused CV examination
- ◆ Vigilance in investigations

B. Based on levels of prevention

- ◆ Primordial
- ◆ Primary
- ◆ Secondary
- ◆ Tertiary
- ◆ Quaternary

C. In concordance with cardiovascular phenotype spectrum

- ◆ As per etiology
 - Atherosclerotic
 - Modifiable risk factor
 - Non- atherosclerotic
- ◆ As per anatomy
- ◆ According to outcome
 - Risk factors reduction
 - Heart failure prevention
 - Arrhythmias prevention

D. As per management strategy

- ◆ Non pharmacological
- ◆ Pharmacological
- ◆ Invasive-medical, surgical

Table-2: Common errors in cardiology.

PATHOPHYSIOLOGY

- ◆ Vigilance in history taking
- ◆ All CVD is atherosclerotic in nature
- ◆ All atherosclerotic CVD is coronary in nature

HISTORY

- ◆ Chest pain is the only symptom of CVD
- ◆ Absence of chest pain means absence of CVD
- ◆ Anginal equivalents are not to be taken seriously

VITAL SIGNS

- ◆ Early/ impending LVF cannot be suspected by checking vital signs
- ◆ Unexplained tachycardia and tachypnea are usually due to anxiety

INVESTIGATIONS

- ◆ Normal echo means normal coronary health
- ◆ A high LVEF is a sign of good health
- ◆ Normal CAG means normal cardiac health
- ◆ Anatomical tests assess cardiac function as well

TREATMENT

- ◆ Dyslipidaemia treatment thresholds and target thresholds for all persons are the same
- ◆ All glucose-lowering drugs can be prescribed in CVD
- ◆ Cardiotropic drugs act only on the heart, and do not impact metabolic/endocrine/general health

(Table-2). Cardiovigilance does not end with screening and diagnosis; its relevance continues while monitoring and treating patients. These clinically important issues form a distinct chapter in the ever-continuing

cardiovigilance saga.

Risk Factors

The risk factors of CVD are well known.⁷ Modifiable factors such as tobacco, physical inactivity, and diets high in fat/salt are proven to drive CVD. Other factors include hypertension, dyslipidaemia, diabetes and obesity. These four vasculo-metabolic factors from the cluster of metabolic syndromes, which is aptly given the acronym DHOL (diabetes, hypertension, obesity, lipids). Dhol, which means 'drum' in many South Asian languages, conjures an evocative image of the drums of CVD, which beat loudly across the region.⁸

Yet other risk factors which play an important role in pathogenesis of CVD include aging of population, foetal programming, environment pollution and betel nut quid addiction.⁹ These are more relevant to South Asia's health ecosystem, and need to be addressed. At primordial and primary levels of prevention, cardiovigilance calls for limiting these negative influences, through legislative, community based and individual choices.

Levels of Prevention

Cardiovigilance can be viewed through multiple prisms. One way of understanding cardiovigilance is by relating it to various levels of prevention.

Primary and Primordial Prevention

Primordial prevention is practiced before risk factors set in, while primary prevention is mandated in the presence of risk factors, but prior to onset of disease. Cardiovigilance calls for proactive efforts to minimize the modifiable risk factors of CVD.

This can be done by legislation and mass education campaigns. At the individual level, too, health care professionals must continually promote (and practice) a healthy lifestyle. This should include healthy diet, physical activity, stress management, and avoidance of substance abuse. Vasculo metabolic risk factors such as diabetes, obesity, hypertension and dyslipidaemia must be screened for, identified and managed appropriately. Exhaustive guidance is available for all of these.

Secondary Prevention

Secondary prevention focuses on persons with pre existing CVD, and aims to delay worsening or progression of the illness. In a person with chronic stable angina or peripheral arterial disease, for example, secondary prevention works to avoid or delay acute coronary syndromes or amputation. Cardiovigilance calls for a multipronged strategy to achieve this, using medical and

invasive therapies, guided by rational investigations and monitoring policies.

Subclinical CVD

Identification of subclinical CVD, as well as atypical CVD, is of paramount importance. Asymptomatic CVD (or subclinical CVD) is prevalent in many cohorts, such as persons with type 2 diabetes, and is even more common in South Asians.¹⁰ Existing guidelines do not recommend routine screening with investigations, but careful history taking and physical examination, focused on the cardiovascular system, can help detect subclinical CVD.

Atypical CVD

History taking is especially important in detecting atypical angina, or subtle symptoms of non-coronary vascular territory involvement. The angina equivalents, also termed as 'sound of silence'¹¹ occur frequently in persons with type 2 diabetes and coexistent CVD. Their etiopathogenesis is explained by autonomic nervous dysfunction and transient congestive heart failure which are common in uncontrolled diabetes.¹² The existence of non-coronary vascular bed dysfunction, such as erectile dysfunction, is an indicator of disease in other vascular bed as poly-vascular involvement is reported in diabetes.

Primary and secondary prevention also encompass pharmacological strategies to prevent CVD. Aspirin and statins, if used judiciously, help in reducing the burden of CVD. Risk stratification engines facilitate rational prescription of such preventive pharmacotherapy.

Tertiary Prevention

Tertiary prevention implies the containment of disease after it has occurred. Examples include a primary angioplasty, or cardiac rehabilitation, after an acute myocardial infarction. Tertiary prevention is usually the domain of the cardiologist. Non-cardiologist health care professionals must be aware of latest developments and advances in the field, so that accurate counseling can be done.

Cardiophenotype Spectrum

Awareness among medical professionals is the cornerstone of salutovigilance. An understanding of the vast spectrum of CVD is necessary in order to institute clinical strategies for its containment. This spectrum is verbalized in the concept of cardiophenotype. The phrase 'cardiophenotype' has been used by various authors in relation to a variety of CVD. The concept of cardiovascular phenotype has also been used to inform choice of glucose-lowering therapy in diabetes.¹³ We utilize the phrase 'cardiovascular phenotype' to describe an individual's risk factors, symptoms, signs and laboratory

Table-3: The cardiovascular phenotype spectrum.

- Vasculometabolic risk factors
◆ Diabetes
◆ Hypertension
◆ Obesity
◆ Dyslipidaemia
- Atherosclerotic cardiovascular disease
◆ CORONARY HEART DISEASE
■ Chronic stable angina
■ Acute coronary syndromes
◆ CEREBROVASCULAR DISEASE
■ Transient ischaemic attack
■ Stroke
◆ PERIPHERAL ARTERIAL DISEASE
- Heart failure
◆ Systolic
◆ Diastolic
- Arrhythmias
◆ Bradyarrhythmias
◆ Tachyarrhythmias
- Pericardial and myocardial disease
◆ Congenital cardiomyopathy
◆ Myocarditis
- Valvular heart disease
◆ Congenital
◆ Acquired
- Diseases of pulmonary vasculature
◆ Pulmonary hypertension
◆ Pulmonary embolism
- Diseases of the Aorta
◆ Aortic aneurysm
◆ Aorto arteritis

imaging abnormalities, as related to cardiovascular health. The term 'cardiovascular phenotype spectrum' includes and expands upon the various CVD that can occur. The CV phenotype rubric provides a framework for all health professionals to identify CVD, including non-atherosclerotic CVD or non-coronary heart disease.

The structure of the CV phenotype framework is based upon simple clinico-epidemiological and anatomic rules. Risk factors, ASCVD, heart failure and arrhythmias are mentioned first, as they are the commonest etiologies and outcomes of CVD. The rest of the list comprises of other CVD, classified according to anatomy. This helps the non cardiologist realize the need to consider the possibility of non-ASCVD, apart from ASCVD, in patients with cardiac symptoms and signs (Table-3).

Vigilance in Treatment

Cardiovigilance is an integral part of cardiovascular therapy. This remains equally important in all persons with CVD, irrespective of their severity. Physicians and cardiologists primarily shoulder the responsibility of

Table-4: Cardiovigilance in heart failure.

Investigations	Compensated Heart failure	Decompensated Heart failure
Screening	Clinical scores	Clinical score, NYHA class
Diagnostic	Echocardiography (IVC/filling pressure)	BNP/nTBNP/hs Troponin I
Monitoring	Clinical/NYHA Echocardiography	BNP/SST2L

Table-5: Cardiovigilance in atherosclerotic cardiovascular disease.

Investigations	Anatomical	Functional
Screening	Echocardiography	TMT; stress test
Diagnostic	Angiography	Nuclear scan
Monitoring	Biomarkers eg, lipids	Clinical scores /NYHA

remaining vigilant while prescribing non-pharmacological, pharmacological or invasive treatment modalities. These health care professionals must be aware of possible metabolic effects of cardiotropic therapy, as well as cardiac side effects of vasculo-metabolic (including glucose-lowering) treatment. Knowledge of these aspects of pharmacology helps in ensuring appropriate cardiac health.

Cardiovigilance in Specialty Practice

Cardiovascular is applicable in non-cardiac care settings as well. Every medical specialty experiences cardiovascular morbidity in its patients. In diseases such as diabetes and chronic kidney disease, the leading cause of mortality is CVD. Paediatricians must keep a high index of suspicion for congenital and rheumatic heart disease. Psychiatric conditions such as schizophrenia and substance abuse are associated with high cardiovascular risk, and require cardiovigilant medication.

Neurologists who manage cerebrovascular disease, and vascular surgeons who look after peripheral arterial disease, must view cardiovascular health from a holistic, polyvascular viewpoint. Similarly, chronic venous disease (the Cinderella CVD) should not be forgotten while practicing cardiovigilance.

Pharmacovigilance

Pharmacovigilance, or drug safety, is an important theme of cardiovigilance. Many medications (antibiotics, antipsychotics, antidiabetics) may be associated with cardiovascular side effects, and prescribers should be vigilant for these. At the same time, cardiotropic drugs themselves may cause adverse drug reactions. These should be prevented, preempted, managed and reported appropriately. Thorough pharmacovigilance and adverse drug reaction reporting should be encouraged as a part of cardiovigilance

Quaternary Prevention

The concept of quaternary prevention must not be ignored while discussing or practicing cardiovigilance. Quaternary prevention calls for avoidance of investigation, over labelling or overtreatment on medical practice.¹⁴ This must be adhered while managing cardiac patients.

Investigations and therapeutic interventions should be advised according to current guidelines. Patients and their families should be counseled about their health, and treatment should be planned after informed, shared decision-making.

Quinary Prevention

Quinary prevention has recently been defined as a "Means of preventing health-related hearsay or misinformation, or its ill effects on the health of individuals".¹⁵ This responsibility includes not only addressal of misinformation related to heart disease, but also spread of correct information. The framework of all these levels of prevention has been discussed comprehensively in the context of atrial fibrillation.^{16,17} Similar awareness is needed to enhance cardiovigilance in its entirety.

Summary

The concept of cardiovigilance is a useful one, which permeates all specialties of medicine and surgery. All efforts should be made to popularize, and enhance adherence to the principle of cardiovigilance.

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