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Research Article

# Salivary Biomarker<sup>©</sup> In Biddable Hypertension Or Early Hyperglycaemic State Associated Ischemic Dilated Cardiomyopathy Related Myocardial Vessel Constriction

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**Abstract**— Myocardial infarction is one of the most common cause of death. Breathlessness is also a common symptom in diseases of heart secondary to Systemic Hypertension, a leading cause of MI related HF. The study of salivary biomarker in these cases on therapy(1)leading to development of Ischemic Dilated Cardiomyopathy is a common need. This spectrum of events is common not only in Hypertension(2) on poor compliance but also Diabetes Mellitus type 2 undiagnosed early or with poor compliance to OHAs. The alacrity of patient confidence for uptake of Clopidogrel before reaching the hospital ICU is underappreciated with the insidiousness in reporting Cardiac Troponin I which still remains IOC[20]. Age also is a confounding factor for the chronic disease of the nature of DM 2 and HTN in adults and this disease affects elders more than 30 years.

Type 2 Diabetes Mellitus patients on Insulin show Desmin DR positivity<sup>2</sup>. rADA<sup>3</sup>, acts as a positive regulator of T cell co-activation by binding DPP4.[3]

Phlebotomy had raised the ethical issue in relation to thrombophlebitis as a complicating factor of hospital admission. Ischemic dilated cardiomyopathy being an autosomal dominant genetic disorder of cardiac myocyte(Z disk and sarcomere) eccretes Desmin from the lymph into saliva. Necrobiosis of cardiac myocardium was studied in 425 patients. Lancinating type of chest pain is the common manifestation in the aforementioned condition. Age related Unstable Angina and Stable type is associated with Diabetes in elders more than 40 years.

.Causes for these include MODY-2, mutations of HNF-1-4, Insulin promoter factor-1 and Neuro-D1. Other surgical causes of DM-2 associated with CAD include pancreatitis, pancreatectomy, cystic fibrosis and endocrinopathies include acromegaly, hyperthyroidism, glucagonoma and somatostatinoma, Cushing's syndrome and pheochromocytoma.

Early diagnosis of Heart Failure(HFe) is a prognosticative indicator in this paradigm of illness.

Stippling is an ethically superior aid for investigating patients with EF as low as 60% due to CAD in HFe with premeditated diagnosis of Dilated CMP

The lacuna here is feasibility of an investigation in relation to cost-benefit ratio.

**Keywords**-- "*Myocardial Infarction*", "*Ischemic Dilated Cardiomyopathy*", "*MODY 2*", "*HFe*", "*Hypertension on poor Compliance*", "*Desmin DR positivity*", "*Cardiac Troponin I*"

Abbreviations --- HFe-Early diagnosis of Heart Failure with normal ejection fraction, AMI-Actute Myocardial Infarction, RMI-Recurrent Myocardial Infarction, AWMi-Anterior Wall MI, RVMI-Right Ventricular MI, IWMI-Inferior Wall MI, CAD-Coronary Artery Disease, DCMP-Dilated Cardiomyopathy.

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## I.INTRODUCTION

Myocardial infarction is the most common cause of death and when associated with Ischemic Dilated CMP(2) is a cause of Sudden Cardiac death The prevalence of the disease approaches 3 million people worldwide, with more than 1 million deaths in the United States annually. Continuing medical activity to assess the severity and extent of myocardial damage using diagnostic tests such as electrocardiography (ECG), cardiac biomarkers, and imaging modalities.(8) AMI can be divided into 2 categories: non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI). Unstable angina resembles an NSTEMI, but normal cardiac markers demarcate it. Stable Angina resembles USA but with negative markers and pain with exertional workers including homemakers..STEMI(9)(10)(11) which needs fibrinolysis or Angiogram requires prompt therapy. Angiogram is not the Rx of choice in NSTEMI. Ischemic cardiomyopathy (ICM) describes ineffective blood pumping by the heart as a result of ischemic damage to the myocardium. It is a common condition and a significant cause of morbidity and mortality. A hidden pathology as depicted by ECG is the Inferior Wall MI(hereafter referred to as IWMI or RVMI-Posterior Wall MI) and Stable Angina(SA) where ST depression or elevation in leads II,III,aVF and qR wave in V1 is myocardial vessel spasm or myocardial plaque rupture/erosion due to Atherosclerosis, respectively the latter being the earliest index marker in progressive Dilated CMP. Plaque erosion is typically associated with a non-ST-elevation MI (NSTEMI) presentation of ACS, while plaque rupture is more common in ST-elevation MI (ST Atherosclerosis is the buildup of fats, cholesterol and other substances in and on the artery walls. This buildup is called plaque. The plaque can cause arteries to narrow, blocking blood flow in STEMI patients.[25] Ischemic cardiomyopathy (ICM) is a term that refers to the heart's decreased ability to pump blood properly, due to myocardial damage brought upon by ischemia. When discussing the term ICM, coronary artery disease (CAD) has to be addressed. CAD is a condition characterized by the formation of plaques in the coronary blood vessels, decreasing their capacity to

supply nutrients and oxygen to the contractile heart muscle. The 2016 Heart Disease and Stroke Statistics update of the American Heart Association (AHA) reported that there are about 15.5 million adults in the United States who have CAD, and the overall death rate from CAD was 102.6 per 100,000

Dilated cardiomyopathy is more common in Black people than in white people. It's also more prevalent in men than in women.[23]

Inferior myocardial infarction is associated with an asymmetric tethering pattern in which the posterior mitral leaflet (especially at P3) is more restricted than the anterior, resulting in one or more posteriorly directed MR jets.

## II.METHODS

A convalescent group of 425 cases were assessed with a reference to discrete(non-continuous) variables including Blood pressure, Serum cholesterol and serum triglyceride value. Routine blood tests were performed in these persons. Blood glucose was appended to the study detail in cases and controls and a salivary specimen was procured in clients with NSTEMI, STEMI and T wave flattening or inversion. It was referred to notice ECHO parameter of ESV of more than 23ml in cases where a diagnosis of early Heart failure with Ejection fraction variable of 58% or more had incidental Ischemic Dilated Cardiomyopathy that would lead onto heart failure with preserved Ejection fraction. This prospective two-arm, single-blinded and controlled study was undertaken as an interdisciplinary collaborative work between Mahatma Gandhi MCRI, ESI MCP, Panimalar MC and Saveetha MC.

Patients included were Hypertensives, those with diagnosed Myocardial Infarction by Trop I positivity and Type 2 Diabetes Mellitus. Patients excluded were those with co-morbid

Lower respiratory tract infection and those on Gliptins. ADA sample was secured which was neutralised by Red phosphorus when blended with the stippled specimens. The specimen remained collected in controls whereas cases showed market turnaround in a selected subset to methyl orange.



### III.Pathophysiology

Lymphatic system of the heart is poorly understood in the normal heart. In this study as proved to be not undermining, the vessels are located along the V5 axis of the normal heart at 55 degree. In Ischemic dilated

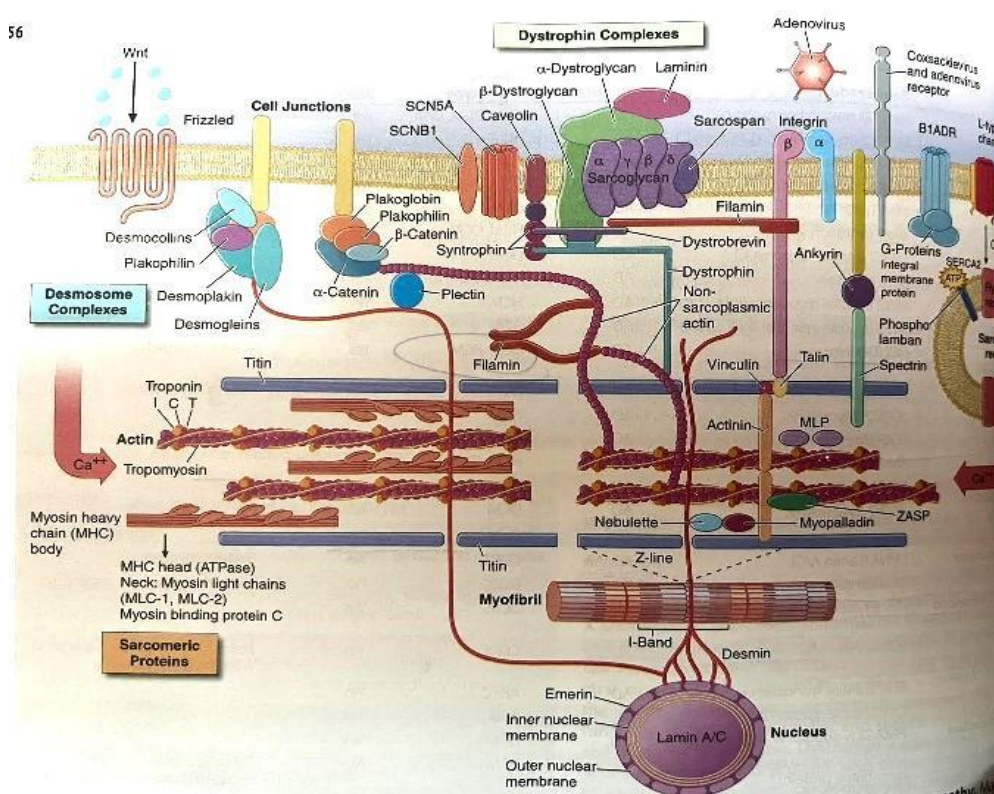
CMP, there is right axis deviation and excretion of muscle spindle proteins into lymphatic system. Secretion of the salivary biomarker as time taken to reach thoracic duct and salivary glands is of value in this subset of cases.

**TABLE 1: Time zone of cardiac enzyme excreted in Cardiomyopathy**

Cardiac enzyme	Time of detection in saliva circulation from cardiac lymph	Peak in Saliva	TIME OF DECLINE
VINCULIN	5mins-18hours	15 mins	18hours
WITH DESMIN IN ADDITION			

In Left atrial dilatation progressing to Dilated CMP, presence of qR wave in II and V1 and ECHO

report of ESV of LV determined by thickness of LV was also practical to assessment



Courtesy : Harrison's textbook of Internal Medicine;19<sup>th</sup> edition Pg 1566 Disorders of Cardiovascular system-Golden subset showing Vinculin release.

#### IV. Results and Discussion :

112 patients out of 425 patients had Dilated CMP.EF in all these patients,factor of ischemia staying unaddressed was 58-65% indicating that Clopidogrel was missed in this Ischemic type of CMP.

It was remarkable to note that the AWMi or Unstable Angina (USA) with early presentation had Systemic Hypertension whereas essential Hypertension was well managed reiterating that compliance to antihypertensives was well received.68.5 % of patients presented with AWMi or USA in a hyperglycemic state on poor diet control.(see table 2)

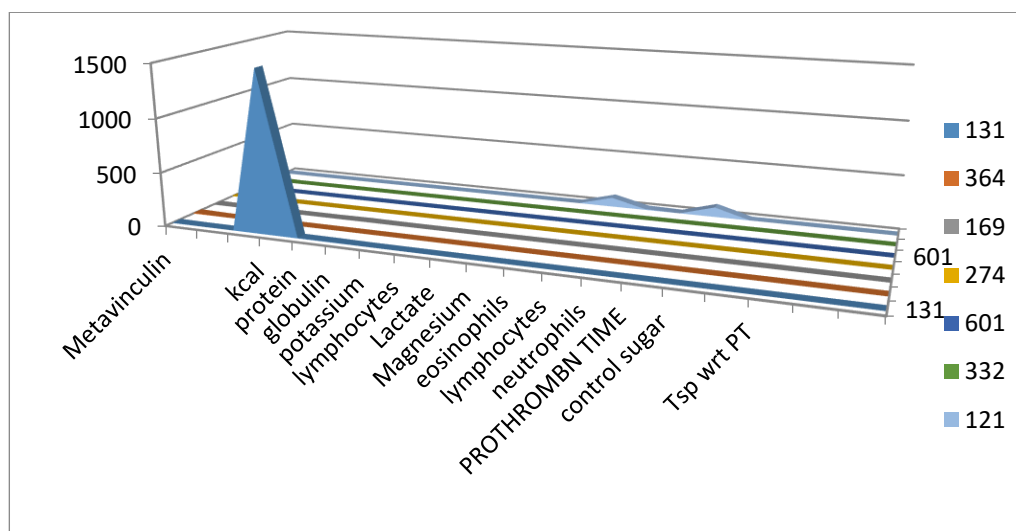
**Table 2 : Type of CAD and associated co-morbid illnessi leading on to DCMP**

Type of CAD/Co-morbidity	Hypertension(Systemic)	Hyperglycemic state and/or Diabetes Mellitus type 2
AWMi	106	89
USA	35	101
RVMI/IWMI/PWMI	272	125
SA	7	72

The golden subset of Myocardial Infarction who presented with InferiorWall MI and/or Stable Angina were hyperglycemics with RBG more than 131 mg/dl(hyperglycemic state) or Blood Pressure more than 130/90 mmHg despite on good diet,a lifestyle modification or antihypertensive therapy where Dilated CMP was an earlier event(p value<0.01) which when diagnosed early by the salivary biomarker would call for anti-platelet addition.This subset included the younger age group with hypertriglyceridemia/ or surgical causes

of hyperglycemia.In this golden subset,Metavinculin loss was not of hematinic proportion but that of lymphatic proportion(reflected as normal serum protein levels,see graph 2)

Only 7% of Cardiac dilated CMP are non-ischemic[22] Remarkably,lesser than 65% of presenting individuals within the golden subset are hypertensives or hyperglycemics.



Graph 2 : The rise of metavinculin hyperglycaemic state at values of blood glucose above 131mg//dl

#### V.Conclusion

The hypothesis of Echocardiographical management of Hypertrophy-dilation(eccentric to concentric) of left ventricle and its associated co-morbidity namely Hypertension or hyperglycaemic state which leads to either Dilated CMP progressing as Heart failure or MI-especially IWMI or stable Angina with exertion is a common lacuna that needs to be investigated.Cholesterol value and triglycerides in these patients were borderline or elevated.Lymphatic vessels

are located in the V5 axis of the heart.Whereas Trop I is positive in indicating STEMI and NSTEMI,Metavinculin in the same curvilinear pattern can help in demarcating RVMI and SA,becoming a potential candidate fo differential investigation of choice.

Graph 1 A sample line graph using colors which shows desmin and vinculin equally is effective as Trop I in RVMI and Stable Angina demarcation it from other causes of CAD..



Patient						
Trop I	0.2	6.1	5.4	3.2	4.3	8.1
30/9/22						
Desmoglein	3.76	4.12	5.68	3.56	3.78	6.8



That Hypertension or hyperglycaemic state takes the course from eccentricity(6) to concentric hypertrophy of LV is a misdeamanour the Blood pressure plays on the heart.This stage of illness can then be identified ethically by a salivary biomarker called Meta-Vinculin.This paradigm on presentation fails to manifest by symptoms with an added difficulty of showing preserved Ejection Fraction(HFpEF) .Thus a marker in saliva can help prevent more heart disease related death.

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