

Autopsy Review of Sudden Cardiovascular Deaths In A Tertiary Hospital At South Eastern Nigeria From July 2007-June 2012.

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Abstract:-Aim and Objectives: To determine the cause of sudden cardiovascular deaths and observe morphological changes in heart following death.

Materials and Methods: A cross section of seventy-seven(77) cases of deaths involving only cardiovascular deaths autopsies from July 2007 to June 2012 was done. A detailed autopsy including external and internal post-mortem examination was done. The results were analysed using Microsoft Excel.

Results: These show 62% of sudden cardiovascular deaths as males,38% in females and 11% are of ages less than thirty(30) years. In this later age range males are 10% and females 1%.

Conclusion: These go to say if one could have identified all risk factors and measures instituted most patients would have been saved from sudden death.

Keywords: Sudden Cardiovascular deaths,Hypertension,autopsy

I. Introduction:

Cardiovascular disease is the most common cause of deaths in USA;it is the leading cause of deaths in men between 20-65 years of age. Zipes and Wellens estimate that up to 80% of individuals dying suddenly of cardiac disease die of coronary artery disease.¹ There is a circadian variation in the incidence in the early morning. Willich et al reported the peak incidence as between 7am and 9am (after discounting individuals found dead during this time), which was 70% higher than the average rate during the rest of the day.² The explanation was attributed to increased activity of the sympathetic nervous system, known to occur in morning, which may predispose to cardiac arrhythmias.

Sudden cardiovascular deaths is currently described as natural, unexpected death occurring within an hour of onset of final symptoms.³ If sudden cardiovascular deaths were to occur in the young, a systematic forensic autopsy including toxicological analyses must be done. The toxicology is to exclude toxic causes and to determine any drug-related cardiomyopathy as cocaine or amphetamine induced cardiomyopathy which could lead to sudden death. Also cardiac toxicity of anabolic steroid abuse must also be taken into account.⁴ It is also well known that coronary artery disease (CAD) including acute myocardial infarction, recent thrombosis and high grade coronary stenosis (>75%) due to atheroma is still major cause of death in people of 35 years.⁵

Pulmonary diseases are usually caused by pulmonary embolism and asthmatic attack. When neurological signs are elucidated it represents cerebral haemorrhages and epilepsy.³ There is now frequency of right ventricular cardiomyopathy (RVC in 70% of sudden death between ages of 20-40 years in USA).⁶

The new forms of RVC with minimal gross anomalies and other exclusive left ventricle involvement have been described.^{7,8} These have shown that left ventricle and interventricular septum involvement has a poor prognosis. Clinically, it has been shown also that patients with left ventricular hypertrophy (LVH) have significantly more premature contractions than normal individuals or those with hypertension without (LVH).⁹⁻¹¹ In most cases, sudden cardiovascular deaths have been recorded from coronary atherosclerosis. In a study of 500 consecutive autopsies of ages 20-99 years Dimaio et al found acute thrombosis in 13.4% as cause of death.¹² The left coronary and its branches showed higher incidence of thrombosis when compared with right. Hence it is acceptable to see in all deaths due to coronary atherosclerosis severe atherosclerosis of the coronary vessels. However, this is obscured in hypertensive cardiovascular disease as this is lacking because of plaque formation resulting to thickening of the walls by arteriosclerotic deposits. In elderly the lumina are patent, vessels rigid, calcified tubes because of calcium deposits in vessel walls. In some others while epicardial coronary arteries are non-occluded, microscopic examination of myocardium shows severe occlusive dysplasia of the intramural coronary arteries.¹³

Berry aneurysms per se are not uncommon as few cases seen were with hypertension and a social history of smoking which could have an effect in formation of aneurysm. The co-existing atherosclerosis may

play a second role leading to focal destruction and weakening of the vessel walls. Multiplicity of aneurysm most invariably rupture at apex with haemorrhages into subarachnoid space.^{14,15}

Heart failure has become an increasingly prevalent cause of death world-wide despite advances in therapy still cause sudden unexpected deaths.¹⁶

II. Material And Methods:

the study was carried out in a tertiary hospital at south east of Nigeria from July 2007 –June 2012. A total of 77 bodies of both sexes,aged and young were autopsied. The result was analyzed using all information obtained in medical case history. These includes all particulars of the deceased,activity prior to death,past medical/social history(smoking habit,known hypertension or diabetic);results of any investigation;any pathology in organs other than cardiovascular system. Any eye witness account was consulted prior to death.

III. Result:

CARDIOVASCULAR DEATH IN JULY 2007- JUNE 2012

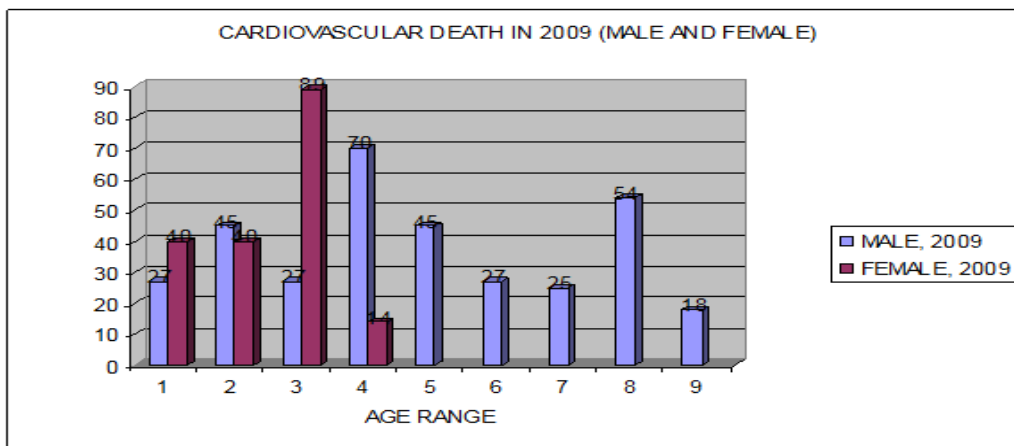
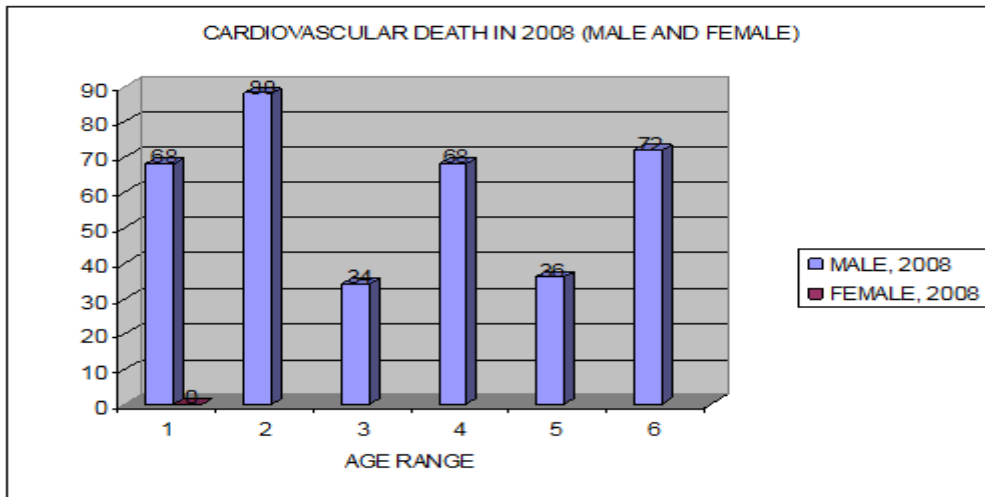
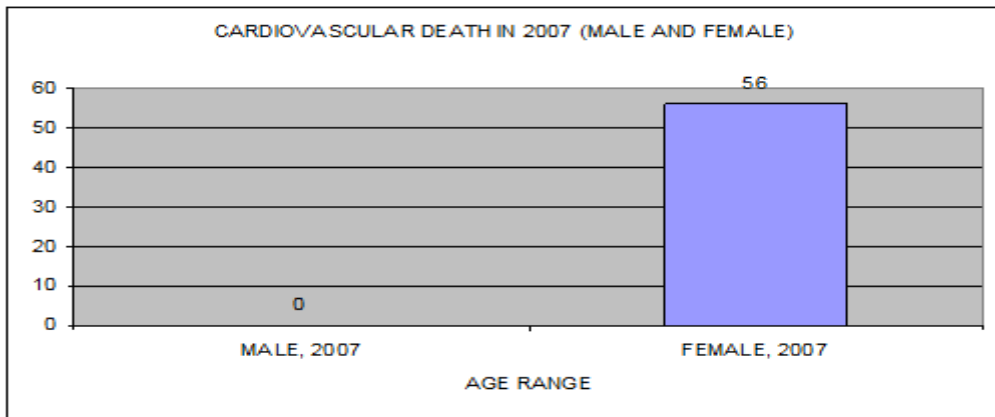
2007	2008	2009	2010	2011	2012
56	68	40	75	29	70
	88	45	50	70	65
	34	27	55	54	55
	36	27	55	25	60
	72	70	25	45	75
	36	40	33		49
	72	45	72		50
		27	25		48
		25	20		35
		89	50		68
		14	60		57
		Adult	25		60
		Adult	Adult		48
		54	53		63
		Adult	50		56
		18	22		54
		70			78
		40			64
					76
					72
					60
					72
					47
					45
					39
					40
					43
					44
					80
					76

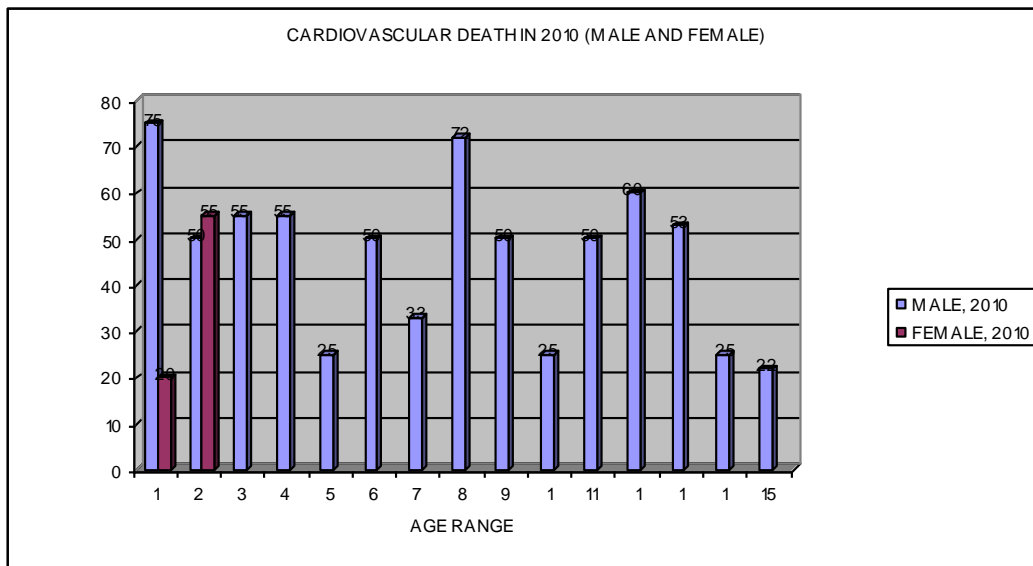
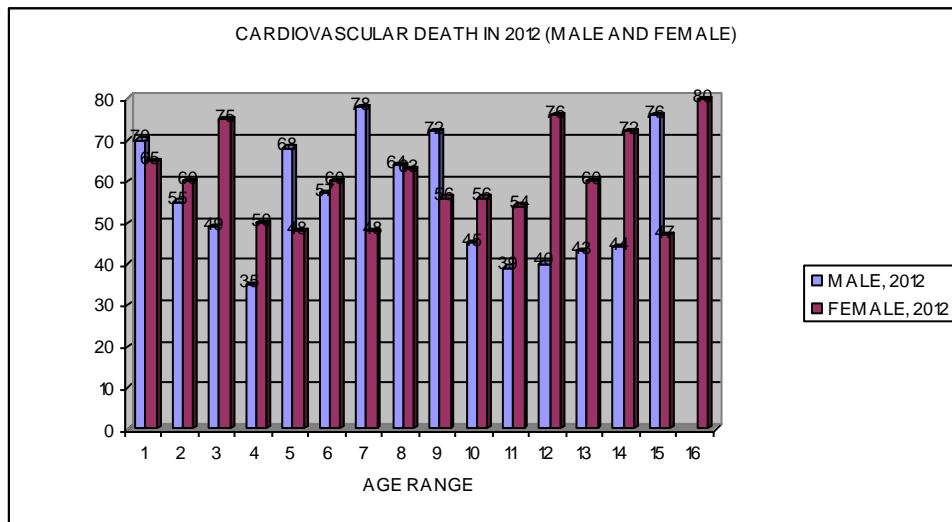
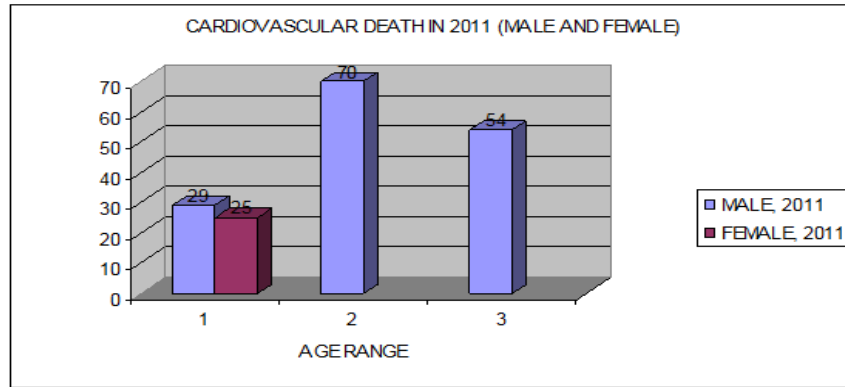
GENERAL OVERVIEW OF AGE DISTRIBUTION OF CARDIOVASCULAR DEATH FROM JULY 2007- JUNE 2012

2007		2008		2009		2010		2011		2012	
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	56	68	0	27	40	75	20	29	25	70	65
		88		45	40	50	55	70		55	60
		34		27	89	55		54		49	75
		68		70	14	55				35	50
		36		45		25				68	48

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		72		27		50				57	60
				25		33				78	48
				54		72				64	63
				18		50				72	56
						25				45	56
						50				39	54
						60				40	76
						53				43	60
						25				44	72
						22				76	47
											80





IV. Discussion:

Sudden death is currently described as natural unexpected death occurring within an hour of new symptoms. Most studies focused on cardiac causes of death because they are always cardiovascular related. This is because cardiac causes are leading cause of sudden death, as other causes are not well known since many such deaths are not autopsied.

In most of the hospitalized patients with a known history who died suddenly, autopsy revealed an enlarged heart with left ventricular hypertrophy and minimal coronary atherosclerosis.¹⁷ The mechanism of death in these cases is sudden cardiac arrhythmia most likely ventricular fibrillation. These have been seen clinically that patients with left ventricular hypertrophy have more ventricular premature contractions than

normal individuals or ones with hypertension without left ventricular hypertrophy.⁹⁻¹¹ This observation agrees with our study that a significant number of individuals who die suddenly and unexpected with clinical history of hypertension have only left ventricular hypertrophy without severe arteriosclerotic involvement of their coronary arteries.

A few of our patient had a ruptured berry aneurysms invariably at the apex. These led to haemorrhage into the subarachnoid spaces and in the substance of the brain. Death here is due to generalized vasospasm triggered by the subarachnoid haemorrhage, with resultant ischaemic injury to the brain.

In our study, 62% of deaths recorded were males, 38% females and 30% below the age of 30 years. In this age range still male were 10% and 1% are female. This shows the great preponderance of the cases that occurred were in males. Also most of the male middle aged as seen in the graphical representation died as a result of sudden death rupture of cerebral vessels leading to intracerebral haemorrhage. This is supported by Vincent dimaio et al¹⁸ when he said that intracerebral haemorrhages are more common in males and in negroid race than in whites probably due to greater incidence of hypertension.

The sudden death seen in the young is utmost important despite our detailed forensic autopsy though lacking forensic toxicological analysis. Indeed, toxicology is important as to exclude a toxic cause and help to determine drug related cardiomyopathy as cocaine or amphetamine-induced cardiomyopathy which can give sudden death. Hair testing is needed even if no or low levels of drug are detected in blood, in order to show a past history of drug abuse. These results must be compared with a known cardiac pathologic findings suggestive of cocaine or amphetamine cardiac toxicity, as association of microfocal fibrosis, contraction band necrosis and cardiomyocyte hypertrophy. Also cardiac toxicity of anabolic steroids must be checked.⁴

STUDY LIMITATIONS: These include the relatively low patronage to autopsy and varying degrees of description/detail autopsy reports. This is attributed to the attitudinal/ignorance of the relatives and at times the unwillingness of the clinicians to request for autopsy. Their general belief in both relatives/clinician in most cases is patient is a known hypertension hence it is not necessary. They few that accepted appear for knowledge purpose to guide their lineage/medico-legal attention in cases of feeling of medical negligence. The sudden deaths seen in the young in our study no toxicological analysis were done. We known that a systemic forensic autopsy is never complete in this age group without toxicology analysis of drugs example cannabis, amphetamine etc.

V. Conclusion:

In conclusion, the progress in autopsy diagnosis of sudden death depends respectively on the following criteria- scene investigation, number and quality of autopsies and use of complementary technique especially molecular biology. Indeed, molecular autopsy is now needed to overcome autopsy diagnosis difficulties, although molecular investigation is not yet available in daily work of forensic pathologist. However, improvement needs to be done in all the new discovered methods of clinical, biological or imaging diagnosis used in investigating sudden deaths.

A major problem for cardiologist will be to identify asymptomatic patients at high risk of sudden death as to avoid early manifestation of the diseases. That is to develop preventive strategies as to use of anti-arrhythmic agents or implantable cardioverter defibrillator, and the ability to identify the incidence, causes and circumstances surrounding the sudden death must be well known and provided by the forensic pathologist.¹⁹

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