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Original Article

Epidemiology of cardioprotective pharmacological agent use in stable coronary heart disease

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ABSTRACT

Objective: To determine use of class and type of cardioprotective pharmacological agents in patients with stable coronary heart disease (CHD) we performed a prescription audit.
Methods: A cross sectional survey was conducted in major districts of Rajasthan in years 2008–09. We evaluated prescription for classes (anti-platelets, β-blockers, angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB), calcium channel blockers (CCB) and statins) and specific pharmacological agents at clinics of physicians in tertiary ($n = 18$), secondary ($n = 69$) and primary care ($n = 43$). Descriptive statistics are reported.
Results: Prescriptions of 2290 stable CHD patients were audited. Anti-platelet use was in 2031 (88.7%), β-blockers 1494 (65.2%), ACE inhibitors 1196 (52.2%), ARBs 712 (31.1%), ACE inhibitors − ARB combinations 19 (0.8%), either ACE inhibitors or ARBs 1908 (83.3%), CCBs 1023 (44.7%), statins 1457 (63.6%) and other lipid lowering agents in 170 (7.4%). Among anti-platelets aspirin–clopidogrel combination was used in 88.5%. Top three molecules in β-blockers were atenolol (37.8%), metoprolol (26.4%) and carvedilol (11.9%); ACE inhibitors ramipril (42.1%), lisinopril (20.3%) and perindopril (10.9%); ARB's losartan (47.7%), valsartan (22.3%) and telmisartan (14.9%); CCBs amlodipine (46.7%), diltiazem (29.1%) and verapamil (9.5%) and statins were atorvastatin (49.8%), simvastatin (28.9%) and rosuvastatin (18.3%). Use of metoprolol, ramipril, valsartan, diltiazem and atorvastatin was more at tertiary care, and atenolol, lisinopril, losartan, amlodipine and simvasatin in primary care ($p < 0.01$).
Conclusions: There is low use of β-blockers, ACE inhibitors, ARBs and statins in stable CHD patients among physicians in Rajasthan. Significant differences in use of specific molecules at primary, secondary and tertiary healthcare are observed.

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1. Introduction

Patients with coronary heart disease (CHD) are at higher risk for subsequent cardiac events and mortality. A number of drugs have been shown to reduce second cardiovascular events and mortality in large randomized controlled trials.[1] These are anti-platelets, β-blockers, angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs) and cholesterol lowering statins.[2] Current guidelines for the prevention of cardiovascular events among individuals with established CHD recommend anti-platelets, β-blockers, ACE inhibitors and statins in all individuals.[3,4] However, there is substantial gap between recommendations and implementation of these medicines in routine clinical practice.[5]

Recent studies have also shown that second and third generation pharmacological agents among these cardioprotective drug classes have important pharmacological and clinical benefits. For example, metoprolol has been reported to be better than atenolol in reduction of cardiovascular events,[6] ramipril and perindopril are more cardiovascular protective as compared to first generation ACE inhibitors,[7,8] newer ARBs such as telmisartan are equivalent to ACE inhibitors in cardioprotective effects,[9] and newer statins such as atorvastatin and rosuvastatin have dosing ease and less toxicity over older statins.[10,11] Studies in developed countries have reported that there occurs a substantial change in pharmacological drug use over time and also newer molecules are rapidly absorbed into practice once the clinical trial evidence emerges.[12] Use of different pharmacological agents and, specifically, newer molecules has not been studied in patients with CHD in India. To evaluate the use of various cardioprotective medicines and to document the use of different pharmacological agents within the broad class of drugs, used for secondary prevention in CHD patients, we performed a cross sectional study.

2. Methods

The study was approved by the institutional ethics committee. Details of the study protocol and methods have been reported earlier.[13] In brief, a proforma was prepared that included demographic details of patients, diagnoses, and drug prescriptions. Data on demographic and personal detail of physicians were also collected. Physicians were classified as primary care physicians who had basic qualifications and were working in rural or urban clinics and dispensaries; secondary level physicians who were having a postgraduate qualification in internal medicine and practising independently or in government clinics, primary health centers or secondary level government or private hospitals; and tertiary level physicians were those with subspecialty qualification in cardiology or cardiac surgery and working at tertiary level hospitals with cardiac invasive and surgical management. The trade names of drugs were deciphered and classified into pharmacological groups that included aspirin, clopidogrel or other anti-platelets agents, β-blockers, ACE inhibitors or ARBs, statins, other lipid lowering medicines such as fenofibrate, short- and long-acting nitrates, dihydropyridine or nondihydropyridine calcium channel blockers (CCBs), potassium channel openers (eg, nicorandil), metabolic modulators (eg, trimetazidine), antioxidants, multivitamins, diabetic medications, and other medications.

The study was performed at all large districts of Rajasthan state over a period of 15 months from September 2007 to December 2008. Consent from the physicians prescribing at primary, secondary, and tertiary sites was obtained and the prescriptions were studied during a single day at the local pharmacy. This was to minimize bias and negate the influence of changing the prescribing habit once awareness of monitoring was apparent. We could evaluate prescriptions of 43 general practitioners or primary care physicians, 61

Table 1 – Cardiovascular pharmacological agents prescribed in stable CHD patients.

Pharmacological molecules	Patient numbers	Proportion within each drug class %
Anti-platelet agents ($n = 2031$)		
Aspirin alone	234	11.5
Aspirin–clopidogrel	1797	88.4
β-Blockers ($n = 1494$)		
Atenolol	566	37.8
Metoprolol	394	26.4
Carvedilol	178	11.9
Bisoprolol	139	9.3
Nebivolol	108	7.2
Propanolol	74	4.9
Others	35	2.3
Angiotensin converting enzyme inhibitors ($n = 1196$)		
Ramipril	504	42.1
Lisinopril	243	20.3
Perindopril	131	10.9
Enalapril	147	12.3
Captopril	87	7.3
Trandolapril	54	4.5
Others	30	2.5
Angiotensin receptor blockers ($n = 712$)		
Losartan	340	47.7
Valsartan	159	22.3
Telmisartan	106	14.9
Candesartan	70	9.8
Others	37	5.2
Calcium channel blockers ($n = 1023$)		
Amlodipine	485	47.5
Diltiazem	298	29.1
Verapamil	97	9.5
Nifedipine	46	4.5
Felodipine	47	4.6
Nicardipine	23	2.2
Others	27	2.6
Statins ($n = 1457$)		
Atorvastatin	726	49.8
Simvastatin	422	28.9
Rosuvastatin	267	18.3
Others	42	2.8
Other lipid lowering ($n = 170$)		
Fibrates	71	41.7
Niacin	29	17.0
Orlistat	35	20.6
Others	35	20.6