MEDICINAL EFFICACY OF ANTIHYPERTENSIVE AGENTS FOR ACUTE INFLAMMATION; AN ASSOCIATED RISK FACTOR OF HYPERTENSION

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ARTICLE DETAILS

1. INTRODUCTION

Hypertension or high blood pressure, which is also called arterial hypertension, is a long-lasting therapeutic complaint in which the blood pressure is at a unwavering high level of 140/90 mmHg [1]. This ailment can be kept in control by changing one’s dietary and lifestyle habits. Important changes in lifestyle that can bring about some degree of relief from this disease include weight loss, reduction in smoking, healthy diet, reduction in sodium intake, regular exercise, and limited alcohol consumption [2].

Sometimes, however, the disease becomes so chronic that simply incorporating these changes into one’s life does not bring desired results [3]. In such cases, drug treatment is usually employed. Numerous classes of drugs are used for this purpose. They include ACE (Angiotensin Converting Enzyme) inhibitors, ARB (Angiotensin Receptor Blockers) drugs, diuretics, calcium channel blockers, alpha-blockers, and peripheral vasodilators [4].

Commonly used drugs for this purpose are Beta-blockers [5]. These drugs provoke the sympathetic nerve stimulus or circulating catecholamines at beta-adrenoceptors that are broadly disseminated all through body systems. Beta-1 receptors are leading substances in the heart and kidney while beta-2 receptors are chiefly present in other organs like the lungs, peripheral blood vessels as well as skeletal muscle. Obstructing beta-1 receptors in the sinoatrial node decreases heart rate. This is called negative chronotropic effect.

Likewise, barring beta-1 receptors in the myocardium drops the contractility of heart muscles. This phenomenon is called negative inotropic effect [6].

Atenolol is a specific beta cardio-selective adrenoreceptor blocking agent. Not unlike the other medications, atenolol can cause some consequences as well. Most of these are expected to be inconsequential and exist only for a shorter period of time [7]. Nevertheless, some may necessitate medicinal care such as stomach upsets like constipation, indigestion, parched mouth, diarrhoea, modification in taste, sluggish or uneven heartbeat, giddiness, intestinal discomfort, nausea, buzzing in the ears, glitches with vision, dry eyes, blocked nose, hallucinations, skin sensitivity, icy extremities and amplified hair damage [8]. However, if this drug is suddenly terminated, it becomes very problematic. There have been some reported cases where people have developed chest pain, heart attack, and irregular heartbeat. The potential risk of the development of acute pancreatitis has also been observed in some cases [9]. This condition involves the sudden inflammation of the pancreas that can have lethal side effects and extraordinary death rate even after cure [10,11]. Our following study is based on identification of risk of acute pancreatitis which may occur with different doses of atenolol in Pakistani population.

2. MATERIALS AND METHODS

2.1. Sampling

Patients were recruited from Punjab Institute of Cardiology Lahore (PIC). A total of 74 patients of different ages suffering from hypertension were selected after taking their complete medical history and divided into 2 groups (n=37); patients receiving atenolol as antihypertensive drug, patients administered combination treatment for hypertension based on severity and grade of disorder and compared with control group (healthy). Physical examinations were also carried out and complete records were maintained. All the combination and supportive medicines taken by the patients were noted. Random sampling technique was employed. Patients were administered their respective hypertensive medicine prior to sampling. However, patients experiencing hepatitis and any other concomitant disorder were excluded as patients were on multi drug therapy.

2.2. Sample Analysis

Human C-Reactive Protein (CRP) ELISA Test Kit was used. During this method each sample was permitted to achieve the room temperature. The latex was lightly mixed to dissolve the constituent parts. A bead of full-strength serum was positioned on the test slide via the disposable pipette. A droplet of latex was positioned next to the drop of the serum. Using the alternative end of the pipette, the reagent and serum sample were spread above the complete zone of the test circle. The test slide was lightly slanted forwards approximately once every two seconds for two minutes. Positive and negative controls were also incorporated at consistent intervals. At the end of the test, the test slide was washed by means of distilled water and desiccated.

2.3. Statistical analysis

All the observations were tabulated and expressed as mean± standard error. Statistical analysis was carried out by using SPSS version. 22 (Statistical Package for the Social Sciences). T-test was applied to compare the difference between two variables. The level of probability was p<0.05 [12].

3. RESULTS AND DISCUSSION

Beta-blockers are the major class of drugs for hypertension and due to their improved efficacy, they are mostly prescribed by physicians to hypertensive population. They are also used in different combinations of antihypertensive medications on the foundation of harshness of illness and complaint of patients. CRP levels of 37 hypertensive patients taking beta-blockers alone were tested, the results obtained are described in Table 1 and Figure 1.
and statin profoundly decreased the levels of CRP. The same results were conjunction with beta blockers. The mean value for this group was 0.60
Hypertensive patients were also administered with combination of statin in
with antispastic agents.
Evidence of same results can be taken from a research done by
under normal level depicting no effect of calcium blocker upon level of CRP.
calcium blocker along with beta blockers gave mean value of 0.48 that fall
Combination of calcium blocker statin ACE inhibitor was administered and
combinations.

high levels of CRP can be contributed to under dosages of these
only 7 showed high levels of CRP. Again the 7 patients who appeared with
combinations proved to be highly efficacious in reversing inflammation.
In the present study, patients were also administered several combinations
of antihypertensive agents randomly on the base of harshness of the
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cooperation to conduct this study trail.
In our study population random patients were selected from Punjab
institute of cardiology and we also wanted to record gender statistics of
Pakistani population which is affected from hypertension. So, we found
that females have high potential of developing hypertension, as 53.42% of
random diseased population were females while 46.57% were male.

4. CONCLUSION
This study was designed to check the efficacy of antihypertensive in
decreasing ailment as well as reducing risk of inflammation which develops
secondarily due to hypertension. We conclude that antihypertensive
medications specifically also minimize the inflammation associated with
hypertension but not completely, as inflammation was reversed only in
67.5% population who were using beta-blocker. When treating hypertension, anti-inflammatory medicine treatment must be
suggested to successfully treat disorders and escalate the communal and
psychological status of the patient. Moreover, new antihypertensive
therapies should be exposed with increased efficacy and additional
characteristics in reducing risk of inflammatory pathology. Furthermore,
patients coming with hypertension must also be examined for any
inflammatory sign so that the treatment should be administered
accordingly.

Table 1: Distribution of Hypertensive group on the basis of CRP value

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Drug Class</th>
<th>High CRP</th>
<th>Low CRP</th>
<th>Total CRP</th>
<th>Patients CRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beta-Blockers</td>
<td>12</td>
<td>25</td>
<td>37</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>range (0.3-0.8 mg/dl)</td>
</tr>
<tr>
<td>2</td>
<td>Combination</td>
<td>7</td>
<td>30</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medicines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>19</td>
<td>55</td>
<td>74</td>
<td></td>
</tr>
</tbody>
</table>

Hypertensive patients having High and Low CRP

24.65%

Low

75.34%

High

Figure 1: Population (75.34%) appeared with lower value of CRP by using
beta-blocker, while 24.64% population showed high value of CRP

Beta blocker therapy (atenolol) was administered to 37 patients, out of
which 25 patients appeared with low CRP (C-reactive protein) values
depicting its anti-inflammatory action, while 12 patients exhibited high
value of CRP depicting strong effects of beta blocker in reversing
inflammatory condition. The effect of beta-blocker on 12 patients who did
not appear with stable condition can be contributed to under-dosage of
beta blocker in those patients. Around 50% of our study population was
administered with β-blockers. B-blockers significantly decreased the levels
of CRP of test population [13]. As we know that hypertension is also
associated with inflammation so antihypertensive medication also has
anti-inflammatory effects. These observations are in synchronise with the
study of a researcher who enrolled 49 patients in their study to check
effects of atenolol in decreasing cardiovascular ailment as well as levels of
CRP. Moreover, a group researcher also concluded that C-reactive protein
is a significant risk factor for coronary artery disease, and that beta-
blockers lower the levels of CRP [14]. Furthermore, there is also a study
also stated beta blockers such as metoprolol is a useful addition in lowering
down CRP level.

In the present study, patients were also administered several combinations
of antihypertensive agents randomly on the base of harshness of the
disease and reaction upon therapy. The CRP levels of 37 patients who were
taking combination antihypertensive drugs, based on grade and severity of
disorder were tested. Combinations like statin, ACE inhibitor, diuretics,
calcium channel blocker, AT2 receptor blocker were used. All these
combinations proved to be highly efficacious in reversing inflammation.
About 30 out of total 37 patients appeared with normal value of CRP while
only 7 showed high levels of CRP. Again the 7 patients who appeared with
high levels of CRP can be contributed to under dosages of these
combinations.

Combination of calcium blocker statin ACE inhibitor was administered and
their CRP level were analysed to check the probability of any sign of
inflammation secondarily due to hypertension. CRP level with class of
calcium blocker along with beta blockers gave mean value of 0.48 that fall
under normal level depicting no effect of calcium blocker upon level of CRP.
Evidence of same results can be taken from a research done by
demonstrated that levels of high-sensitivity CRP decreases after treatment
with antispastic agents.

Hypertensive patients were also administered with combination of statin
in conjunction with beta blockers. The mean value for this group was 0.60
and statin profoundly decreased the levels of CRP. The same results were
reported by a group researcher the CRP levels become significantly lower
in patients with CVS disorder when treated with statins [15]. Furthermore,


