A Prospective study on evidence based management of hypertension with co-occurring diseases

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ABSTRACT

Aim
The aim of the present prospective study is to assess the evidence based management of hypertension with co-occurring conditions which includes assessment of (1) Efficacy of anti-hypertensive agents, (2) Rationality of anti-hypertensive agents and (3) Drug interactions.

Method
A Prospective observational study was carried out for a period of months from September 2018 to February 2019 in secondary care hospital. Patient is interviewed to determine the chief complaints, history of present illness, past medical and medication history as well as medical records of patients have been checked for detailed study.

Result
The study was conducted on 300 patients out of which the anti-hypertensive prescribed to 264 patients were rational and the anti-hypertensive prescribed to 36 patients were irrational.

Conclusion
Our prospective study conclude that mono therapy is the most considered treatment option which complies with the JNC8 guidelines on management of anti-hypertensive patients. The benefits of mono therapy and dual therapy in the study population demonstrated are more effective than any other therapy. Finally this study indicated that in our secondary care hospital physicians are well adhered to both JNC8 and AHA guidelines which was a good sign to control hypertension.

INTRODUCTION

An important risk factor for the future development of cardiovascular disease is Hypertension. It can be defined as a condition where blood pressure is increased to an extent that clinical benefit is obtained from lowering of blood pressure to the normal level. Blood pressure measurements include systolic and diastolic components and both are important in determining risk of cardiovascular disease in an individual patient. Hypertension is largely a condition of old age. While diastolic pressure increases at age 50, systolic pressure...
continues to increase with advancing age. Generally, the risk of cardiovascular diseases doubles for every 20/10 mmHg rise in blood pressure. The most common cardiovascular complications associated with hypertension are myocardial infarction and stroke. [1-5]

Recent studies in India show that hypertension is appearing as a major health problem. It is directly responsible for 24% of mortalities due to coronary artery disease and 57% of mortalities due to stroke. Although 69% of people with hypertension are aware that they have the disease, only 54% receive pharmacotherapy and only 27.4% achieve requisite blood pressure control [6-10].

**According to JNC Guidelines**

The categories of blood pressure in adults according to JNC-8 guidelines are given below.

<table>
<thead>
<tr>
<th>BP category</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120 mmHg</td>
<td>And &lt;80 mmHg</td>
</tr>
<tr>
<td>Elevated</td>
<td>120-129 mmHg</td>
<td>And &lt;80 mmHg</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1 HTN</td>
<td>130-139 mmHg</td>
<td>Or 80-89 mmHg</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>≥140 mmHg</td>
<td>Or ≥90 mmHg</td>
</tr>
</tbody>
</table>

BP thresholds for and goals of pharmacological therapy in patients with hypertension according to co-occurring diseases

<table>
<thead>
<tr>
<th>CO-OCCLUDING DISEASES</th>
<th>BP THRESHOLD mmHg</th>
<th>BP GOAL mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Mellitus</td>
<td>≥130/80</td>
<td>&lt;130/80</td>
</tr>
<tr>
<td>Chronic Kidney Disease</td>
<td>≥130/80</td>
<td>&lt;130/80</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>≥130/80</td>
<td>&lt;130/80</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>≥130/80</td>
<td>&lt;130/80</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>140/90</td>
<td>&lt;130/80</td>
</tr>
</tbody>
</table>

**AIMS AND OBJECTIVES**

**Aim**

The aim of the present prospective study is on evidence based management of hypertension with co-occurring diseases.

**OBJECTIVES**

**General objectives**

- To assess the Evidence Based Management of hypertension with co-occurring conditions.
- To assess the Efficacy of Antihypertensive drugs.

**Specific objectives**

- To assess the rationality of anti-hypertensives.
- To assess the Drug Interactions.
- To find out the epidemiology of co-occurring conditions.

**METHODOLOGY**

**Study design**

This is a prospective observational study conducted over a period of six months using questionnaires as a tool. The study conducted at Medicine ward of THUMBAY NEW LIFE HOSPITAL, CHADERGHAT. Patients who admitted to the Medicine ward of the hospital during a six month period from October 2018 to March 2019 will be eligible for enrolment. Patient who meets the following criteria will be enrolled [11-15].

**Collection of data**

Using a suitably designed data collection form, the following details will be collected:

- Patient demographics
- Prescription chart
- Lab data
- Progress chart
• Medical record  
• Doctors note  
• Nursing note

**Inclusion criteria**
1. Patients with hypertension.  
2. Patients with hypertensive complications.  
3. Patients with other co-occurring conditions.  
4. Patients above 20 years of age [16-20].

**Exclusion criteria**
1. Pregnant women and nursing mothers.  
2. Patients below 20 years of age [21-25].

**Method and collection of data**
Patient will be interviewed to determine the chief complaints, history of the present illness, past medical and medication history [16-20].

**RESULTS**

Different parameters were studied in the conducted study and were represented in tabular and graphical manner.

**Categorization based on age and gender**
Medication history of hypertensive patients

Anti-hypertensive pharmacotherapy
Monotherapy

Multiple therapies
Co-occurring diseases

Drug-drug interactions
Rationality

Comparison of monotherapy with multiple therapies

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>On Admission</th>
<th>On Discharge</th>
<th>p - value</th>
<th>t - value</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mono Therapy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBP</td>
<td>132.96±19.19</td>
<td>117.51±11.71***</td>
<td>&lt;0.0001</td>
<td>10.64</td>
<td>15%</td>
</tr>
<tr>
<td>DBP</td>
<td>79.82±7.74</td>
<td>74.55±2.82***</td>
<td>&lt;0.0001</td>
<td>5.53</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Multiple Therapy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBP</td>
<td>140±43.8</td>
<td>118.75±1.3</td>
<td>0.0555</td>
<td>2.23</td>
<td>22%</td>
</tr>
<tr>
<td>DBP</td>
<td>85±26.64</td>
<td>71.21±0.87</td>
<td>0.0829</td>
<td>2.02</td>
<td>14%</td>
</tr>
</tbody>
</table>

All values expressed as mean±SEM, *p<0.05, **p<0.01 and ***p<0.0001 [Paired student t test] as compared to blood pressure on admission.

**DISCUSSION**

Hypertension is a chronic, frequent and usually age-related disorder, which often demands debilitating cardiovascular and renal complications. Blood pressure is generally noted in combination with other cardiovascular risk factors. Diagnosis of hypertension increasingly depends on automated techniques of blood pressure measurement. The pathophysiology of essential hypertension relies on the inability of the kidney to excrete sodium at a normal blood pressure. The central nervous system, endocrine factors, the large arteries, and the microcirculation also play a character in this disorder. Hypertension mostly arises as a complex quantitative characteristic that is affected by varying combinations of genetic and environmental factors. Non-pharmacological strategies can reduce blood pressure. Antihypertensive drug treatment reduces the complications of hypertension. [31-40]

In our study ACE Inhibitors were prescribed with patients with diabetes and Beta blockers for patients with history of MI and CAD. A similar study in Washington, DC had reported a comparable results.64 According to JNC 8 ARBs, CCBs, Thiazide diuretics and ACE Inhibitors are the choice for first line of anti hypertensives which is comparable to our study [41-50].
In our study it was observed that 4% of the prescriptions containing multiple therapies which was lower than recommendations and observations of the other study demonstrated that the multiple therapy was necessary in majority of the patients to attain optimal blood pressure [51-55].

In our study Monotherapy was recommended in 48% of prescriptions. Due to 20% of DDI because of the combination drug and pharmacoeconomic considerations might be the reason which might be attributed to lesser inclination of physicians to go for multiple therapies in our secondary care hospital [56-57].

In the study conducted by us rationality were assessed by JNC 8 and AHA guidelines of hypertension. These guidelines are intended to provide practitioners with the standard approach to the rational, safe and effective use of anti hypertensives for prevention of hypertension based on currently available clinical evidences. Rational recommendations of anti hypertensives in our study was very high i.e., 88% (264) and the anti-hypertensive irrationality was found to be 12% (36).

**CONCLUSION**

In conclusion our results shows that the monotherapy is the most considered treatment option which complies with the JNC 8 guidelines on management of anti-hypertensive patients, the benefits of monotherapy and dual therapy in the study population demonstrated is more effective than any other therapy. As the present study is restricted to 6 months of duration the exact outcomes can’t be expressed. Out of 300 patients analyzed over a 6 months of duration the more number of antihypertensive prescriptions were found to be rational [58].

Finally this study indicates that in our secondary care hospital physicians are well adhered to both JNC 8 and AHA guidelines which was a good sign to control hypertension.

**Limitations**

The limitations of the study include the following criteria:

1. The hypertensive patients not willing to participate in the study.
2. The pregnant and lactating mothers.
3. The patients under the age of 20 years.

**RECOMMENDATIONS**

The current challenge to healthcare providers, researchers, government officials, and the general public is developing and implementing effective clinical and public health strategies that lead to sustained dietary changes among individuals and more broadly among whole population. [59] Racial and ethnic minority population are growing segments of our society. The prevalence of hypertension in these populations differs across groups, and control rates are not as good as in the general population. Clinicians should be aware of these management challenges, taking social and cultural factors into account. [60]

Although this research study provides evidence-based recommendations for the management of high BP and should meet the clinical needs of most patients, these recommendations are not a substitute for clinical judgment, and decisions about care must carefully consider and incorporate the clinical characteristics and circumstances of each individual patient.

**BIBLIOGRAPHY**


