

Hypertension the Silent Killer: The Prevalence of Undetected or Poorly Monitored Hypertension in Hypertensive Intracranial Bleed

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Abstract

Background: Hypertensive intracranial (IC) bleed is a condition associated with high mortality and morbidity, the strongest risk factor of which being uncontrolled hypertension. Most of the patients with a history of unmonitored blood pressure or drug default present to ED in a moribund state with intracranial bleed and usually succumb to their illness.

Objectives: To assess the prevalence of undetected and poorly monitored hypertension in patients presenting with hypertensive intracranial bleed.

Methods: This is retrospective study in which we collected data of all patients admitted in Department of General Medicine, Government Medical College Kozhikode with hypertensive intracranial bleed from January 2017 to December 2017. The data collected were Name, age, sex, history of hypertension, duration of hypertension, evidence chronic hypertension such as LVH or hypertensive retinopathy, proper treatment and follow up, history of diabetes, and the outcome of the patient. Data was entered in Microsoft excel and was analysed with SPSS.

Results: A total of 614 cases of hypertensive intracranial bleed where analysed, the mean age was 63.44years. Male: female ratio was 2.5:1. The in hospital mortality was 216[35.2%]. 390[63.5%] had previous history of hypertension and 224[36.5%] was previously undetected hypertensive. Among those who had hypertension previously 176[45.13%] had poor control or monitoring of hypertension. Total cases of poorly monitored and undetected hypertension come to 400[65.15%]. Evidence of chronic hypertension was present in 72.7% of undetected and 88% of poorly monitored hypertensives compared with only 60% in regular monitoring group which was statistically significant (p value = 0.0034) There was no statistically significant difference [p value > 0.05] in mortality among those with previously undetected or unmonitored hypertension and those with regular BP monitoring.

Conclusion: Undetected and poorly monitored hypertension constitutes a major risk factor for life threatening IC bleed. The prevalence of poorly monitored or undetected hypertension among hypertensive IC bleed patients is 65.15%. These results emphasises the need of regular monitoring of Blood Pressure and proper control of Blood pressure.

Keywords: Undetected hypertension; poorly monitored hypertension; IC bleed

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I. Introduction

Hypertension is one of the leading causes of the global burden of disease. Elevated blood pressure affects more than one billion individuals and causes an estimated 9.4 million deaths per year. Hypertension doubles the risk of cardiovascular diseases, including coronary heart disease (CHD), congestive heart failure (CHF), ischemic and hemorrhagic stroke, renal failure, and peripheral arterial disease (PAD). It is often associated with other cardiovascular risk factors¹.

Hypertension is defined as office SBP values ≥ 140 mmHg and/or diastolic BP (DBP) values ≥ 90 mmHg². Elevated BP was the leading global contributor to premature death in 2015, accounting for almost 10 million deaths and over 200 million disability-adjusted life years. Importantly, despite advances in diagnosis and treatment over the past 30 years, the disability-adjusted life years attributable to hypertension have increased by

40% since 1990. SBP \geq 140 mmHg accounts for most of the mortality and disability burden (>70%), and the largest number of SBP-related deaths per year are due to ischemic heart disease (4.9 million), haemorrhagic stroke (2.0million), and ischemic stroke (1.5million)³.

Intracerebral hemorrhage is one among the dreaded complications that can arise from hypertension and accounts for about 10 % of all strokes. It generally presents as abrupt onset focal neurological deficit with diminishing level of consciousness and signs of increased intracranial pressure. 30 day mortality in intracranial hemorrhage is 35- 40%. Among those who survive, majority are left with some neurologic deficit causing significant disability¹.

Despite having newer drugs and treatment modalities hypertension and its complications continue to be a major cause of mortality and morbidity in population. This study aims to take one complication of hypertension i.e. intracranial bleed and assess the prevalence of undetected or poorly monitored hypertension in individuals who developed this complication and intend to shed some light on the burden the ignorance of a treatable condition like hypertension is causing on our healthcare system.

Aim

To assess the prevalence of undetected and poorly monitored hypertension in patients presenting with hypertensive intracranial bleed.

II. Material and Methods

This was an observational study conducted at a tertiary centre in North Kerala from January 2017 to December 2017. All patients who were admitted in general medicine wards with hypertensive intracranial bleed during the study period were considered for the study. Patients with no evidence of hypertension in the past or during present admission, patients on antiplatelets, patients on anticoagulants, patients having coagulopathy, patients in whom other causes of intracranial bleed was identified, patients with intracranial hemorrhage at atypical sites & patients or bystanders not giving consent were excluded from the study.

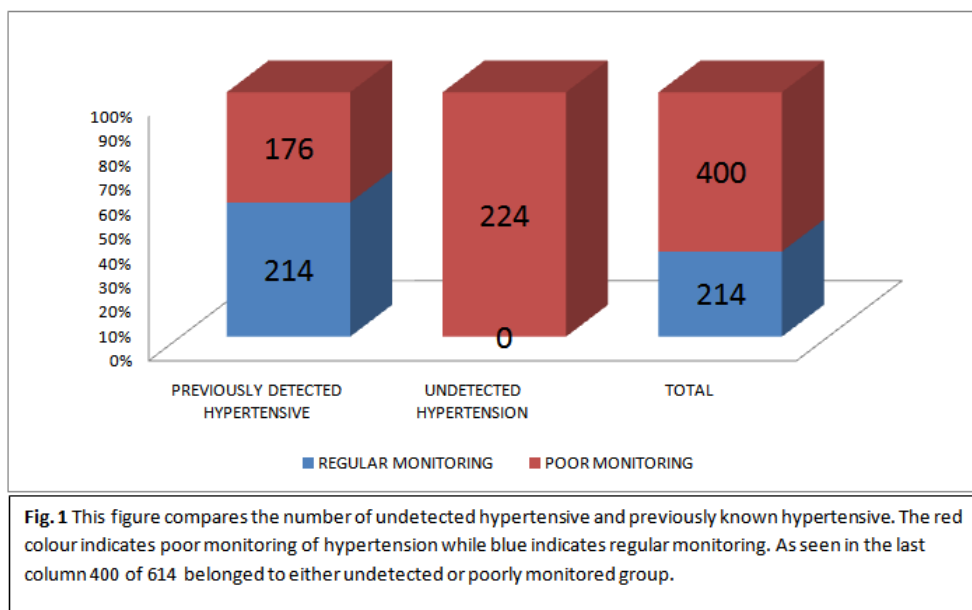
Repeat BP measurement ensuring correct technique was done in all the selected patients to ensure the presence of hypertension according to the existing guidelines⁴. Data was collected from the patients based on a performa which included name, age, sex, history of hypertension, duration of hypertension, evidence of chronic hypertension such as LVH or hypertensive retinopathy, proper treatment and follow up, history of diabetes, and the in hospital outcome of the patient (i.e. whether the patient expired or was discharged).

The control of hypertension and adequacy of follow up was determined based on the existing guidelines⁴. Presence of LVH in ECG was determined by the Sokolow- Lyon criteria⁵. All the data were entered in Microsoft excel and was assessed using SPSS software.

III. Results

A total of 614 patients were included in the study, of which 439 (71%) were males and 175 (29%) were females and male: female ratio was 2.5:1. Mean age of population was 63.44 years, with a minimum age of 25 years, maximum age of 100 years and median of 65 years.

390 patients were known hypertensive, while 224 had no prior history of hypertension and none among undetected hypertensive had regular screening for hypertension. 176 of the 390 known hypertensives had poor monitoring of their hypertension. In total 400 (65.15%) of 614 belonged to either undetected or poorly monitored hypertension group as depicted in **Fig. 1**.



The mean duration of hypertension was 6.34 years and median was 5 years. The maximum duration was 53 years with shortest being 1 year excluding the undetected hypertension group. There was no statistically significant difference in the average duration of hypertension between regular monitoring group and poorly monitored group.

Evidence of LVH in ECG and hypertensive retinopathy was studied as evidence of long standing hypertension.

152 (67.8%) among the undetected hypertension group, 140 (79.5%) among the poorly monitored group and 117 (54.6%) among the regular monitoring group had evidence of LVH in ECG (**Table 1**).

Evaluation of hypertensive retinopathy was challenging as many of the intracranial bleed patients were in comatose or stuporous state and proper fundus examination was not possible. 110 (49.1%) among the undetected hypertension group, 100 (56.8%) among the poorly monitored group and 120 (56.1%) among the regular monitoring group had evidence of hypertensive retinopathy. Proper assessment was not possible in 234 patients (**Table 2**).

So the evidence of chronic hypertension/ hypertension mediated organ damage in the form of either hypertensive retinopathy or LVH was present in 318 (79.5%) of 400 cases of undetected or poorly monitored hypertension compared with only 130 (60%) in regular monitoring group and the difference was statistically significant (p value = 0.0034) (**Fig. 2**).

Table 1 LVH in undetected, poorly monitored and regular monitoring groups of hypertensive

| Hypertension status | LVH + | No LVH | Total |
|---------------------|-------|--------|-------|
| Undetected | 152 | 72 | 224 |
| Poorly monitored | 140 | 36 | 176 |
| Regular monitoring | 117 | 97 | 214 |
| Total | 409 | 205 | 614 |

Table 2 Hypertensive retinopathy in undetected, poorly monitored and regular monitoring groups of hypertensive

| Hypertension status | Proper assessment not possible | Hypertensive retinopathy + | No Hypertensive retinopathy | Total |
|---------------------|--------------------------------|----------------------------|-----------------------------|-------|
| Undetected | 97 | 110 | 17 | 224 |
| Poorly monitored | 63 | 100 | 13 | 176 |
| Regular monitoring | 74 | 120 | 20 | 214 |
| Total | 234 | 330 | 50 | 614 |

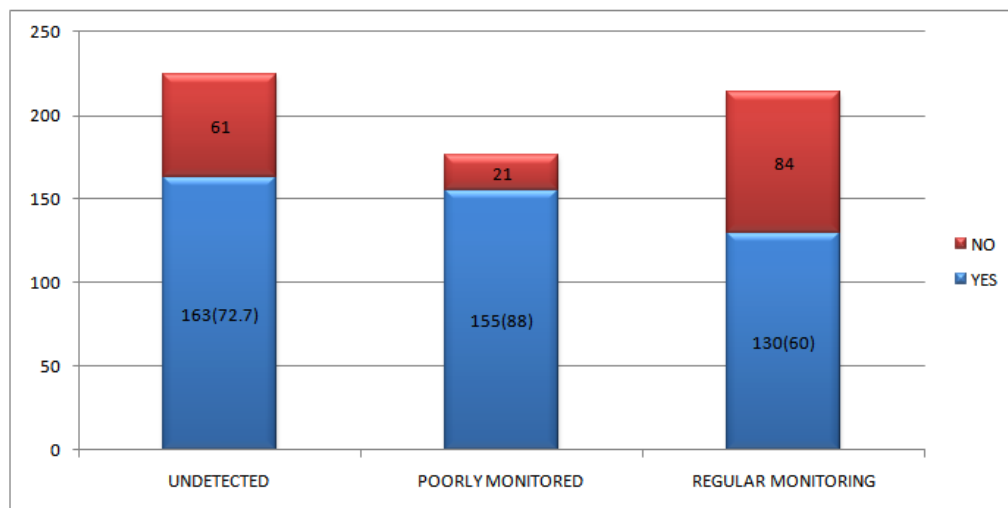


Fig.2 This figure shows the presence of evidence of chronic hypertension in the undetected, poorly monitored and regular monitoring group. The blue bar indicates presence of evidence of chronic hypertension.

216 out of 614 study subjects expired in hospital and the mortality rate was 35.18%. The mortality rate was comparable among males and females (**Table 3**).

Table 3 Mortality in males and females

| | Expired (%) | Survived | Total |
|---------|-------------|----------|-------|
| Males | 156 (35.5%) | 283 | 439 |
| Females | 60 (34.3%) | 115 | 175 |
| Total | 216 | 398 | 614 |

There was no statistically significant association between mortality in previously detected hypertensive and previously undetected hypertensive (p value = 0.85). There was no statistically significant association between mortality in hypertensive on regular monitoring and the poorly monitored (p value = 0.45) and no statistically significant association between mortality in chronic hypertension group and no chronic hypertension group (p value = 0.78).

IV. Discussion

A total of 614 patients were included in our study and majority of the study subjects were males, this was in accordance with the meta analysis conducted by Van Asch CJ et al and Feigin VL et al^{6,7}. Male gender was identified as a risk factor for intracranial bleed in various other studies too⁸.

Hypertension was reported as a risk factor for development of intracranial bleed in many previous studies⁹⁻²³. Considering this fact we have included only those intracranial bleed patients with hypertension in our study.

Our study demonstrated that there was a significant association between untreated or poorly monitored hypertension and development of intracranial bleed. Similar results were also obtained in previous studies conducted by Saloheimo P et al, Juvela S et al, Thrift AG et al, Zodpey SP et al & Giroud M et al^{12,15,16,18,19}. This signifies the importance of adequate control of hypertension.

The small arteries in putamen, thalamus, cerebellum, and pons are particularly prone to hypertension-induced vascular injury. The damage to the arteries depends on the degree of hypertension & duration of hypertension¹. Evaluation for LVH & retinopathy provides an assessment of hypertension mediated organ damage (HMOD) in the patient².

Our study demonstrated significantly higher incidence of LVH and hypertensive retinopathy among the undetected and poorly monitored group compared to the regular monitoring group. This indicates the importance of hypertension mediated damage to arteries and emphasizes the relevance of early and adequate control of hypertension. This is in accordance with the findings of Thrift A G et al, Juvela S et al and Saloheimo P et al^{16,18,19}.

Mortality rate in our study was 35.18% and this was comparable with the world statistics as well as prior studies^{1,6,8}.

The study demonstrates the influence of an easily identified and readily correctable risk factor like hypertension on a condition like intracranial bleed which has got a high mortality and morbidity.

V. Conclusion

614 patients of intracranial bleed were included in the study and mortality rate was 35.2%. The prevalence of undetected and poorly monitored blood pressure among study subjects was 400 of 614 (65.15%). Evidence of chronic hypertension/ HMOD was more prevalent in patients who had poor control of hypertension or were undetected hypertensives. Hypertension if undetected can result in significant mortality and morbidity of which intracranial bleed is one of the life threatening complication. Regular screening for hypertension especially for those who are at high risk, proper adherence to treatment and regular monitoring of blood pressure can significantly reduce hypertension related mortality and morbidity.

VI. Limitations

As the study was an observation study, the association between undetected and poorly monitored hypertension and hypertensive intracranial bleed could not be established. Other relevant and confounding variables like diet, smoking, BMI etc were not studied. Drug compliance and control of hypertension was not assessed. Retinopathy examination could not be properly done. Pre-hypertension monitoring of known hypertensives were not assessed. Study was not designed to exclude reactive hypertension group and 30 day mortality was not calculated.

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