

Vascular Disease in Young Indians (20-40 years): Role of Hypertension

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ABSTRACT

Hypertension (HTN) being one of the important risk factors for cardiovascular disease (CVD) is a significant health concern, especially in India. With age, prevalence of HTN, especially systolic HTN increases. Special attention needs to be directed to HTN in young ages (20-40 years) due to lower awareness, need for early treatment and better control of HTN. HTN in the age group of 20-40 years needs critical reappraisal. Given the high prevalence of HTN in the general population in India, in this review we attempt to provide current evidence and expert opinion on epidemiology, aetiopathogenesis and treatment of HTN in young (20-40 years) Indians.

Keywords: Management, Risk factors, Young hypertensives

INTRODUCTION

Hypertension (HTN) being one of the important risk factors for Cardiovascular Disease (CVD) is a significant health concern, especially in South-Asian region [1]. A linear correlation exists between high Blood Pressure (BP) and Cardiovascular Events (CVE). Compared to the younger (40-49 years) ones, significant differences exist in the incidence of vascular disease and mortality in middle-age (40-69 years) and old-age (70-89 years) populations [2]. With age, prevalence of HTN, especially systolic HTN increases [3]. Special attention needs to be directed to HTN in young ages (20-40 years) due to lower awareness, need for early treatment and better control of HTN [4]. Further, in absence of evidence from randomized clinical trials on benefits of antihypertensive treatment with drugs among younger individuals [5], HTN in the age group of 20-40 years needs critical reappraisal. Given the high prevalence of HTN in the general population in India, in this review we attempt to provide current evidence and expert opinion on epidemiology, aetio-pathogenesis and treatment of HTN in young (20-40 years) Indians.

Epidemiology

The prevalence of HTN in the general Indian population is reported to be 29.8% [1]. Epidemiological data suggests varying prevalence of HTN in young populations. The large prospective SITE (Screening India's Twin Epidemic) study reported prevalence of 12.72% (n=918/7212) in individuals below 40 years [6]. Similar results were reported by Prasad et al., with prevalence of 11.91% (n=183/1537) in South Asian young population [7]. Another study from state of Karnataka reported prevalence of 17.7% (n=65/367) in age group of 30-39 years [8]. In apparently healthy young (18-40 years) individuals, Shukla et al., reported HTN prevalence of 11% (n=186/1735) [9]. Similarly, Aggarwal et al., studied young individuals with acute Coronary Artery Disease (CAD) and observed HTN prevalence of 10.66% (n=13/122) in patients without CAD and 19.66% (n=46/234) among those who had CAD [10]. Literature evidence on gender differences in HTN of young Indian is lacking. SITE study finds no significant gender difference in HTN for overall study population [6]. Prasad et al., reported significantly higher prevalence in men (14.30%, n=146/1022) than women (7.18%, n=37/515) in South Asian young adults [7]. Similarly, from Vietnam, Minh et al., reported higher prevalence of HTN in men (10.8%) than women (4.2%) in age group of 25-34 years [11]. A recent

analysis in individuals aged 18-49 years (mean age 34 years, n=27 081), reported isolated systolic HTN (ISH: systolic BP > 140 and diastolic BP < 90), isolated diastolic HTN (IDH: systolic BP < 140 and diastolic BP > 90) and systolic-diastolic HTN (SDH: systolic BP > 140 and diastolic BP > 90) in 25.3%, 3.7% and 19.8% in men respectively and 12.9%, 2.9% and 9.7% women respectively [12]. Everett et al., found that women are less likely to be hypertensive than men in young age (12% vs 27% respectively) and there is low awareness of HTN amongst both men and women [13].

Need to treat and at what level?

Most guidelines define HTN as elevation of systolic BP \geq 140 mmHg or diastolic BP \geq 90 mmHg in adults aged 18 years and above [5,14-17]. In general adult population, BP beyond 140/90 mmHg remains one of the most important multipliers of cardiovascular (CV) risk. The question often asked is "whether elevated BP is equally hazardous in young individuals?" In a large study by Yano et al., a 31-year follow-up of 27,081 young individuals (mean age 34 years, range 18-49 years) reported higher CV disease and Coronary Heart Disease (CHD) mortality in men and women with systolic-diastolic HTN followed by IDH in men and finally, ISH in women for overall study population. In individuals below 40 years, ISH was associated with significantly higher CV mortality in men (p=0.09) whereas significance was not reached in women (p=0.65) [12]. In another study with 25-year follow-up of 10,874 young men (18-39 years), Miura et al., reported progressively increasing risk of CHD mortality with increasing levels of BP (HR: 1.62, 2.51 and 3.60 for hypertension stages 1, 2 and 3 by JNC-VII definition respectively) [18,19]. One may conclude that HTN in young individual needs treatment and it should be prioritized based on BP levels in an individual.

Treating elevated BP is essential since reducing SBP even by 2 mmHg can reduce risk of stroke mortality by 10% and Ischemic Heart Disease (IHD) and other vascular causes by 7% in middle-age individuals [2]. Similar evidence on benefits of antihypertensive therapy in younger individuals is lacking. Even recommendations from recently released Joint National Committee (JNC) – 8 provide grade-A recommendation for 30 years and above but for 18-29 year individuals it is grade-E since it relies on expert opinion [14]. This is probably because most HTN trials with major CV end points have been conducted in patients aged 55 years and above [20]. Thus BP targets that can provide benefit in terms of CV events

reduction in young individuals remain uncertain. Recommended target for essential HTN in general population is < 140/90 mmHg [5,14-16]. Should this also be the target for age group 20-40 years or should it be lower? Clearly, the evidence is lacking in support of any target value. Higher BP levels at a young age with longer duration of its effects on vasculature raise certain questions that need to be answered. These include: (a) Is treating to lower targets (<130/90) beneficial?; (b) Will treating HTN in 20s and 30s delay the first occurrence CV events?; (c) Whether drug therapy should be initiated as soon as diagnosis is made? In a cohort study of 1207141 Swedish men with mean age 18.4 years followed for 24 years, a U-shaped relation of systolic BP was observed to total mortality with lowest risk for systolic BP < 130 mmHg whereas diastolic BP threshold for mortality was 90 mmHg [21]. Due to prevailing scarcity of published evidence, we believe initiating therapy (lifestyle ± drugs) at threshold of ≥ 140 SBP or ≥ 90 DBP should be the priority and treating to goal of < 140/90 mmHg should prevail in absence of clear evidence on specific BP goals.

Aetio-pathogenesis and Investigations

Essential HTN is the most common form of HTN in general population accounting for up to 95% cases of HTN [16]. In young individuals also, essential HTN remains the primary diagnosis of HTN. Panja et al., followed individuals in 18-30 year age group from Northern India and observed that essential HTN remained common aetiological group (34.8%) [22]. However, an essential step in management of HTN in the young populations is to rule out secondary causes of HTN. Clinically, a high level of suspicion for secondary HTN is essential in young individuals. Camelli et al., reported common occurrence of secondary HTN before 40 years and observed the prevalence of about 30% [23]. Exclusion of secondary causes of HTN is must in: (a) adults < 40 years; (b) sudden worsening of patients' condition; (c) uncontrolled HTN with 3 medications; (d) accelerated HTN with or without papilloedema or retinal haemorrhage; or (e) cerebrovascular accident below 50 years of age. HTN is associated with an underlying cause in about five percent of young individuals. Common aetiologies include renal parenchymal disease, renovascular disease, endocrine disorders, vascular conditions and drugs [Table/Fig-1] [24-27]. HTN in pregnancy is a distinct entity that should be one of the causes to be evaluated in young females.

Etiology		Investigations
Renovascular	Renal Parenchymal Disease	Urine Examination, Renal Ultrasound, Biopsy
	Renal vascular Disease	Renal Ultrasound, Renal Angiography – CT or MRI
Endocrine	Hyper- or Hypothyroidism	Thyroid hormone concentration
	Cushing's Disease	Dexamethasone suppression test
	Pheochromocytoma	Concentrations of urinary free catecholamines, metanephrines and vanillylmandelic acid (VMA), MIBG-I 131 (meta-iodobenzylguanidine)
	Primary aldosteronism	Plasma aldosterone/renin ratio, plasma aldosterone after intravenous saline
	Hyperparathyroidism	Serum calcium, serum parathyroid hormone
	Acromegaly	CT brain / MRI, Growth hormone levels
Vascular	Coarctation of aorta	Echocardiography, Doppler, CT imaging
Other	Obstructive sleep apnea	Polysomnography
Drugs	Non-steroidal anti-inflammatory agents (NSAIDs), estrogen, testosterone, steroids, immunosuppressant, carbamazepine, fluoxetine, lithium, tricyclic antidepressants (TCAs), amphetamines, cocaine, sympathomimetic agents, and herbal drugs like ephedra, ginseng, etc.	

[Table/Fig-1]: Aetiologies and investigations for secondary HTN in young individuals and drugs responsible for rise in BP [24-27].

Evaluation of Secondary causes of HTN

There is a general agreement that thorough history and accurate clinical examination can give important clues to the underlying cause of HTN. Thus, it is of paramount importance particularly in the young hypertensive patient.

Following examinations are recommended.

- Accurate BP measurement in both upper limbs
- Leg BP readings
- Retinal examination
- Abdominal or peripheral bruits
- Haemoglobin levels
- Complete urine examination
- Thyroid function tests
- Renal function tests and serum electrolytes
- Electrocardiogram
- 2D Echocardiogram (if possible, a colour Doppler study will help to identify LV diastolic dysfunction)

Among secondary causes, renal disease (parenchymal and vascular) remains most common cause of HTN in young individuals. Observations by Panja et al., suggest that renal disease is the most common aetiology of secondary HTN in young Indians (26.4%) [22]. Ruling out bilateral renal artery stenosis is important in young individuals. It should be suspected in cases of rapidly progressive oligouric renal failure [25]. Non-invasive and invasive tests can help in assessment of renal artery stenosis. Captopril augmented renography, duplex renal ultrasound, Gadolinium-enhanced Magnetic Resonance Angiography (MRI), Computed Tomography (CT) angiography are common modalities for evaluation of renal arteries and renal disease [24,25]. Routine use of renal ultrasound in evaluating every young individual with HTN is debatable. It should be individualized taking in to consideration a strong clinical suspicion and patient's perspectives.

Stress and HTN in young

Increasing level of stress especially psychological stress could contribute to high BP and HTN. A prospective study of 13-year follow-up of more than 4100 normotensive young individuals (18-30 years) reported that larger BP responses to acute psychological stress predict risk of incident HTN in their mid-life [28]. Thus stress can add to development of HTN. Large number young Indian population is working and they are constantly exposed to certain stress. Study of 1071 young Indians (19-30 years) working at Information Technology/Information Technology Enabled Service industry reports alarming figures. Overall HTN prevalence was 31% and that of pre-HTN was 45.7%. In the age-group of 19-25 and 26-30 years, stage-I HTN was reported in 18% and 23% individuals respectively and stage-II HTN was reported in 5% and 3% individuals respectively [29]. Thus stress especially job-stress can have substantial impact on development HTN in the young.

Pregnancy and HTN

Chronic HTN complicates around five percent of pregnancies, and is likely to be seen more frequently as the age group. Pregnancy induced HTN (pre-eclampsia and eclampsia) is an issue related directly with pregnancy. Elevated BP however may continue in post-partum period and continue as persistent or chronic HTN. Sometimes HTN first noted in pregnancy may be due to secondary causes like renal disease, endocrine diseases and neurological disorders. It is advised to evaluate for secondary causes of HTN in all pregnant females to exclude treatable causes of HTN. HTN before, during and after pregnancy is major contributing factor for maternal and fetal morbidity and mortality [30-33]. Worse still, these patients exhibit increased CV morbidity in the future. Thus

young females in reproductive age group should be thoroughly evaluated and treated.

Treatment of HTN without Co-morbidities

Management of HTN is essential. Various guidelines released in recent years provide substantial evidence based recommendations for treating HTN [5,14,15,17]. But advice on management of HTN in the younger age group remains scant and unrecognized. We identify major concerns that need addressal in young Indians. These include use of tobacco including smoking from young age, higher consumption of salt in households, lack of adequate physical activity, unhealthy food habits, increasing levels of obesity, higher levels of stress and lack of adequate sleep. Beside these, some other factors like illicit drug use, use of anabolic steroids and psychiatric conditions also need careful attention. Thus initial treatment of HTN in young should largely be directed towards lifestyle modification.

Lifestyle modification

Tobacco abstinence: In a large study on smoking from India, Jindal et al., reported 15.6% prevalence (study sample = 73605) of smoking with higher rates amongst males (28.5%) than females (2.1%). Adjusted odds ratios of any tobacco smoking were 6.068 and 12.154 in the age-group of 25-34 and 34-44 years suggesting substantial rates of smoking in young individuals [34]. Further use of tobacco from early childhood and adolescence poses higher threat of CV risk. Atherosclerotic effects of smoking are well known and need no description here. Availability of tobacco in different forms in India makes tobacco abstinence more difficult [35]. Avoidance of tobacco in any form should be promoted and counseled at regular intervals in young hypertensives.

Salt reduction: Mean salt intake on daily basis is higher in Indians. In hypertensives, Radhika et al., reported significantly higher mean daily salt intake (9.9 vs 8.0 g, $p < 0.0001$) and dietary sodium intake (4357 ± 1570 mg vs 3607 ± 1209 mg, $p < 0.0001$) than normotensives. HTN correlated linearly with increasing quintiles of salt intake [36]. Studies on salt intake in young individuals and especially in Indians are lacking. In a meta-analysis, Strazzullo et al., studied 19 cohort samples from 13 studies involving 177025 participants and reported association of excess salt intake with greater relative risk of stroke (pooled Relative Risk {RR} 1.23, 95% Confidence Interval (CI) 1.06 to 1.43; $p = 0.007$) and CV disease (RR, 1.14, CI 0.99 to 1.32; $p = 0.07$). Most studies involved middle-age population and only few studies involved individuals below 40 years [37]. Given the strong causal association with HTN and CV events and higher mean salt intake in Indian households, lowering salt intake to recommended levels of ≤ 5 gm/day (Campbell 2015) is advised and stressed-on in young individuals.

Change in food, food habits and physical exercise: Restriction of high calorie diet and reducing intake of saturated fatty products should be rigorously advised in young individuals. Alcohol restriction is mandated in young individuals. Minimal consumption of processed foods that are rich in salt, sugar and fats should be promoted [38]. Further, it is advised that parents should follow healthy food habits in their routine to inculcate healthy food habits from childhood [39].

Physical inactivity is very common in Indian population. In Indians aged 20 years and above, Anjana et al., reported physically inactivity in 54.4% individuals ($n = 7737/14227$) [40]. Similarly, Ravikiran et al., reported 61.3% physically inactive individuals aged over 20 years from urban Indian region [41]. Health benefits of physical activity are huge and it is strongly recommended. In a retrospective analysis, Johnson et al., reported that only 55% of young (18-39 years) hypertensives were having documented lifestyle education at 1 year. However, individuals with dyslipidemia or family history of HTN or CAD had higher odds of having lifestyle education and therapy [42]. A moderate intensity exercise for 30-

45 minutes five days a week is minimal recommended exercise for all ages with HTN. On average, physical activity reduces systolic BP by 2-5 mmHg and diastolic BP by 1-4 mmHg [43]. One important critical issue is the adherence to physical activity. This is often more challenging in obese individuals. To improve patient adherence to physical exercise, it is advisable to counsel patients on benefits of exercise in increasing energy expenditure, preservation of fat free mass, and its role in maintaining weight loss. Alternatively, cognitive behavioral strategies can be adopted [44].

Each of the interventions described above are linked to benefits beyond HTN control [45]. The United States Preventive Services Task Force (USPSTF) provides grade A recommendation to counseling on tobacco and grade B for counseling on healthy diet and physical activity for individuals with CV risk [45,46]. Thus we advise every physician to effectively recommend lifestyle therapy to young individuals with HTN.

Yoga and meditation: Yoga, together with meditation has been found to be effective in controlling blood pressure. This effect may be due to a normalization of autonomic cardiovascular rhythms [47].

The available evidence on yoga has been criticized stating that most studies were not randomized, had smaller sample size, had inadequately described yoga programs and did not use standardized outcomes measures. The benefits also have been found to be modest. But these studies have used only yoga asana, pranayama, and/ or short periods of meditation for therapeutic purposes. But in fact yoga is a holistic way of life leading to a state of complete physical, social, mental, and spiritual well-being [47]. It is not merely doing one asana for a short period of time. There is a need for larger, long term well designed randomized clinical trials for assessing the effects of lowering BP in patients with prehypertension and stage 1 hypertension considering yoga as a way of life and not a short term therapeutic intervention.

Lifestyle therapy for Mild HTN: How long?: In a recent analysis, subjects ($n = 1114$, mean age: 33 ± 9 years) with stage-1 HTN untreated for at least 3 months having follow-up data available for at-least 2 years were included. Ambulatory BP (ABP) was performed at baseline, 3 months and at the end of study. Mean follow-up was for 11 ± 6 (range: 2-20) years. Strong predictors of future normotension were a normal ABP at baseline and at 3 months and office BP decline of over 10 mmHg after a year [48]. Thus in young individuals with mild HTN (stage 1) long period of observation should be allowed before taking decision on drug therapy. At least duration of 3-12 months should be allowed before starting drug treatment with close follow-up of ABP, home BP or office BP.

Pharmacological treatment

In young patients, diastolic BP (≥ 90 mmHg) may have stronger relationship with total and CV mortality and up to 20% mortality could be explained by elevated DBP. ISH may occur with normal central aortic BP. Such individuals need close follow-up and lifestyle therapy is recommended [5]. Structural changes in large arteries of hypertensive patient evolve over time and may manifest after substantial time duration as ischemic heart disease, stroke or renal disease. Thus it may be prudent to arrest these structural changes early in the course of HTN [49]. A limited data exists on this hypothesis. Treating with valsartan to BP $< 140/90$ was shown to slow and/or reverse early CV disease in asymptomatic high-risk patients with HTN [50]. With generous follow-up on lifestyle advice, BP tends to decline. If BP remains above the expected goal even after persistent lifestyle changes, antihypertensive therapy can be started.

Choosing a drug is important in a young individual. Most guidelines for HTN recommend use of all major classes of drugs for treating young hypertensives [5,14-17]. Among these,

Angiotensin Receptor Blockers (ARBs), Angiotensin Converting Enzyme Inhibitors (ACEIs) are preferred as initial choice of agents although thiazide diuretics, Calcium Channel Blockers (CCBs), Beta Blockers (BBs) can be used alternatively for initiation and maintenance of treatment [5,16,17]. Two antihypertensive drugs either as singly or as combination therapy (from any class of drugs mentioned above) should be used when systolic BP is 20 mmHg or higher and/or diastolic BP is 10 mmHg or higher from the desired goal [17]. Strong evidence from randomized controlled trials on CV outcomes with antihypertensive therapy in young individuals is lacking. However, a meta-analysis involving 1,90,606 participants from 31 trials compared total major CVEs after antihypertensive treatment for young (<65 years) and old (≥ 65 years) observed no difference between age groups or differences in drug classes on major CV events. Also, no significant interaction was seen between age and treatment [51].

Role of beta-blockers (BB)

It is long believed that BBs should be preferred as first choice in young population. But this has been debated. In older (≥ 60 years) patients, significantly higher risk of stroke was observed with atenolol (RR: 1.17, 95% CI: 1.05-1.30) but not with other antihypertensives. With non-atenolol BB, RR was 1.22 (95% CI, 0.99-1.50) but did not reach statistical significance. Contrast to this, atenolol was associated with reduced risk (RR: 0.78, 95% CI: 0.64-0.95) of stroke in young adults (<60 years) and non-atenolol BBs were associated with lower risk of composite cardiac endpoint (RR: 0.86, 95% CI: 0.75-0.99). This suggests differential effects of BBs by age with potential benefits in young than old [52]. Thus for BB, young age is more important factor than choice of specific BB. They can be preferred in young individuals especially those with increased sympathetic drive, along with other antihypertensive agents [5].

Erectile Dysfunction (ED) is feared with use of BB in young individuals. But evidence suggests not just BB, but other antihypertensives may also have association with ED. The apparent ED in an individual is more likely because of underlying disease or to the anxiety related to side-effects of drugs [53]. Fear of ED might be the reason for nonprescription of BB and assurance may improve acceptance of BB in younger individuals.

Diuretics: Should they be used as sole agents for HTN?

Guidelines did not differ for four major classes of drugs as initial choice for young HTN. A very scant data exist for recommending diuretic as sole agents in initial management of HTN in young. In a small study (n=17) of young (18-35 years) pre-hypertensives, amiloride 10mg a day reduced systolic BP, diastolic BP, central systolic BP after 4 weeks. Thus diuretic treatment with amiloride can help prevent progression to HTN and thereby CV disease [54].

Assuring compliance

In CV disease, under utilization of preventive medications is high among younger age groups. Mehta et al., observed that young individuals (35-44 years) were 30-40% less likely being prescribed with BP lowering medication compared to older (65-75 years) adults [55]. Compliance to the prescribed therapeutic regime is an unsolved issue in patients with HTN. Hashmi et al., identified factors like younger age, poor awareness, and symptomatic treatment to be associated with poor adherence to antihypertensive therapy [56]. Every effort on part of treating physicians and young hypertensive is needed to ensure effective compliance to prescribed therapy. Drug combination with long acting medications will help improve compliance.

Treatment of Hypertension with Co-morbidities

There is very little data about the most effective treatment strategies for younger patients with high blood pressure [57].

Further association of HTN with co-morbidities makes it more difficult to advise best therapeutic strategy. In absence of clear evidence, we feel co-morbidities should be managed in line with their management in older adults. Choices of therapy in specific co-morbid conditions are tabulated in [Table/Fig-2].

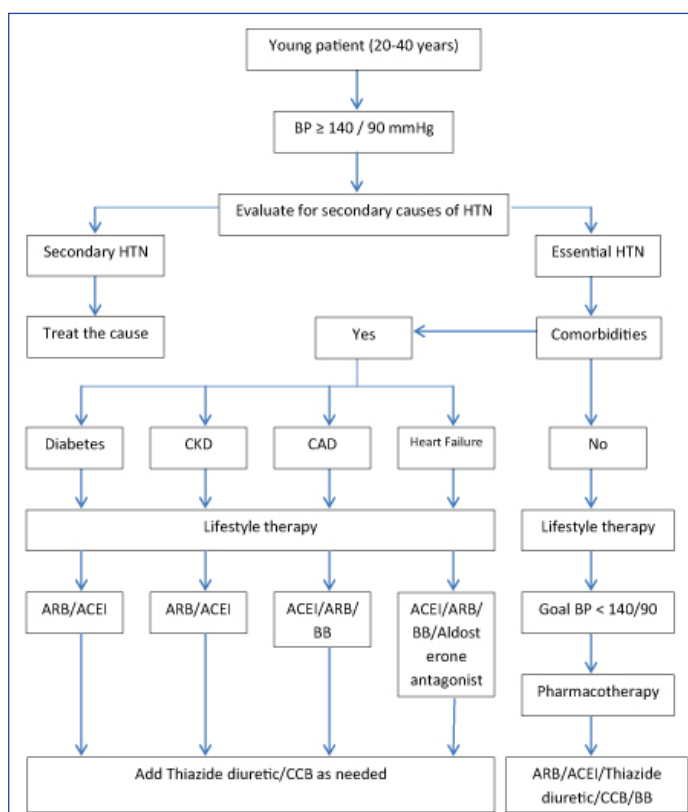
Comorbidity	Initial choice	Second Preference	Third preference
Diabetes	ARB/ACEI	CCB	Thiazide diuretic
Chronic kidney disease	ARB/ACEI	CCB/Thiazide diuretic	Alternate drug for second preference
Coronary artery disease	BB + ARB/ACEI	CCB/Thiazide diuretic	Alternate drug for second preference
Stroke	ACEI/ARB	CCB/Thiazide diuretic	Alternate drug for second preference
Heart Failure	BB + ACEI/ARB + Diuretic + K sparing diuretic	Dihydropyridine CCB	

[Table/Fig-2]: Choice of therapy in HTN with co-morbidity (ASH-ISH/ACC AHA CAD/ADA).

Other co-morbidities like obesity, Obstructive Sleep Apnea (OSA), chronic obstructive pulmonary disease, and chronic infections need special attention. There is knowledge gap in understanding these conditions in young HTN. A study in college students (mean age 20 years) by Pensukasan et al., found 6.3% students at high risk for OSA and 4.5% had HTN. High risk of OSA was associated with HTN independent of demographic and lifestyle factors. Thus treating OSA is important modalities to prevent HTN in healthy young individuals [58].

BP Goal in HTN associated with Co-morbidities

A BP goal of <140/90 mmHg is recommended in patients with diabetes, coronary artery disease and chronic kidney disease (CKD) without proteinuria [5,15,59]. In patients of CKD with proteinuria, a lower goal of <130/80 may preferable [14]. Further, American Diabetes Association (ADA) recommends lower target (<130/80) for young (age not specified) patients with HTN and diabetes [59]. An approach to the treatment of young HTN patient is detailed in [Table/Fig-3].



[Table/Fig-3]: Approach to treatment of young HTN patient

Summary of expert opinion

- Hypertension in the young is increasing in prevalence. Current prevalence average around 12%.
- Essential HTN is the primary cause of HTN even in this young population.
- Evaluate secondary causes of HTN in each young individual. A thorough history and clinical examination is vital to get clues for secondary HTN. Assessment of renal parenchymal and vascular disease by renal ultrasonography or angiography should be individualized.
- Management of HTN in pregnancy is a specialized group. Careful follow-up is needed post-partum in view of future risk of CV morbidity.
- Lifestyle therapy remains cornerstone in management of HTN in the young. Strict adherence to lifestyle management should be ensured.
- Lifestyle therapy should be followed up for adequate time in young individuals before starting medications.
- In lack of evidence on CV outcomes with antihypertensive therapy in young individuals, our management strategies are based on recommendations for older adults.
- A goal of <140/90 mmHg is recommended for HTN without co-morbidities. A lower goal may be targeted in these patients but evidence on benefit in terms of CV outcomes is lacking.
- Lower goal <130/80 may be useful in HTN associated with co-morbidities. Again evidence on CV outcome benefit is unclear.
- ACEIs/ARBs should always be preferred as first line agents in patients not responding to lifestyle therapy.
- CCBs/thiazide diuretic/beta blockers can be added or used as initial choice in patients with co-morbidities.
- Use of fixed dose combinations preferably of drugs with once daily dosing is favoured to ensure adherence to therapy.

CONCLUSION

Management of HTN in young is essential to reduce long-term morbidity and mortality. The benefit of treating HTN in young is not only limited to reduction in BP but extends to prevention of structural and functional cardiovascular damage. Lifestyle therapy should be aggressively followed over a considerable period of time. Adherence to the therapeutic regime should be assured for higher benefits from BP reduction. In absence of clear evidence on young population on benefits of therapy, we identify a great need of prospective, randomized studies over a long duration of time in the young individuals with HTN.

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