Co-enzyme supplements effects on blood pressure: A comparative study

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Co-enzyme supplements effects on blood pressure: A comparative study

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ABSTRACT

Background: Blood pressure (BP) is a common and classic problem globally. Coenzyme Q10 (Co-Q10) are an organic molecules have the ability to maintain the continuous oxidation-reduction cycle. The study aimed to assessed the of coenzyme Q10 (Co-Q10) effect in cases with prehypertension.

Methods: A case-control study done in Ibn-Sina Hospital from 22th Nov 2022 to 23th of Oct 2023. In this study, 100 subjects were enrolled (60 males and 40 females) with age ranged between 28 and 71 years. Their BP ≥140 and ≤90 mmHg. The cases were detected clinically by a practitioner doctor as pre-HTN. Features for the Diagnosis of pre-HTN upon the ACC/AHA guidelines [4] in 2017 for different HTN phases. Three-months follow-up of 50 cases that were underwent diet control and lifestyle modifications whereas 50 cases received Co-Q10 (ubiquinone, Liquidsun, Stamford, UK, Cat. No. 320274) 200mg per day. Both systolic and diastolic BP were measured and recorded for all cases at base line of the study and post 3 months of administer of Co-Q10.

Results: The data showed a significant statistical difference in systolic and diastolic BP ($p<0.01$), between both arms. A massive dropping in the systolic and diastolic BP at the end of 3 months when compared with base-line records in the Co-Q10 group.

Conclusion: The daily administration of Co-Q10 enhance the reduction of both systolic and diastolic BP within pre-HTN cases.

KEYWORDS: Coenzyme Q10, blood pressure, hypertension,

INTRODUCTION

Raise blood pressure (BP) is a common and classic problem globally. Hypertension (HTN) and pre-hypertension (pre-HTN) raise the incidence of CVD [1]. Pre-HTN define as an intermediary stage between HTN and normal BP [2]. Pre-HTN and HTN have significant health challenge in developing countries [3].

In 2017, ACC and AHA recommend the rules for different phases of HTN to: Normal (<120/80 mmHg); High (≥120 and ≤ 129/<80 mmHg); stage-I (≥130 and ≤139/≥80 and ≤89 mmHg) and stage-II (≥140/≥90 mmHg) [4].

Individuals with a higher BMI have more pre-HTN occurrence (greater systolic and diastolic BP, greater cholesterol and TG concentrations, dropped eGFR, raise FBS and greater homeostasis model assessment- insulin resistance (HOMA-IR) [5-7]. In India, the commonest risk factor are family history, obesity and sedentary lifestyle [5].

Coenzyme Q10 (Co-Q10) are an organic molecules which described firstly by Frederick Crane of Wisconsin (US) since 1957 [8]. They are present in all membranes of cell and in mitochondria as 2 forms reducing (ubiquinol) and oxidizing (ubiquinone). They are consisted of a benzoquinone groups and a poly-isoprenoid side chains. In human, it consist of 10 units (Co-Q10 or ubiquinone) [9]. It have the ability to maintain the continuous oxidation-reduction cycle and have a great electron bearers. Co-Q10 concentrations are specifically larger in some organs as kidneys, heart and liver due to requirement of a productive energy transfer molecule that support high metabolic rate [10].

The work aimed to assessed the effects of Co-Q10 in cases with high blood pressure.

METHODS

Design and setting

A case-control study done in Ibn-Sina Hospital from 22th Nov 2022 to 23th of Oct 2023. In this study, 100 subjects were enrolled (60 males and 40 females) with age ranged between 28 and 71 years. Their BP ≥140 and ≤90 mmHg.

Participants

The cases were detected clinically by a practitioner doctor as pre-HTN. Features for the Diagnosis of pre-HTN upon the ACC/AHA guidelines [4] in 2017 for different HTN phases.

Screening

1. Physical and clinical examination.
2. CBC, RFT, LFT, TFT, electrolytes and urinalysis.
3. ECG and echo-study.

Follow-up and supplementation

Three-months follow-up of 50 cases that were underwent diet control and lifestyle modifications whereas 50 cases received Co-Q10 (ubiquinone, Liquidsun, Stamford, UK, Cat. No. 320274) 200mg per day.

Inclusion criteria

All stabilized individuals on medical treatment.

Exclusion criteria

1. Unstable angina
2. MI
3. Major surgery
4. Endocrine diseases
5. Plasma creatinine >2 mg/dl,
6. Raise liver enzymes
7. Abnormalities of electrolytes levels

Ethics

The study was approved by the Institutional Review Board of hospital.

In apparently healthy and cases' groups, the mean± SD for Systolic and Diastolic BP was calculated.

Data collection

Both systolic and diastolic BP were measured and recorded for all cases at base line of the study and post 3 months of administer of Co-Q10.

Statistics

Statistics was done by SPSS ver.24 (IBM, NY, US). Unpaired independent t-test was used to compare the baseline characters between the healthy and pre-HTN cases' group. The mean and SD used for quantitative variables. The statistical significance was set at a P-value <0.05.

RESULTS

The data showed a significant statistical difference in systolic and diastolic BP ($p<0.01$), between both arms (Table 1). A massive dropping in the systolic and diastolic BP at the end of 3 months when compared with base-line records in the Co-Q10 group (Table 2).

Table 1. Comparison of pressure parameters among groups of the study.

Pressure parameters (mmHg)	Cases	Control	P-value
	Mean ±SD		
Systolic	141.56±0.89	120.54±0.82	0.01
Diastolic	90.34±0.88	82.66±0.67	0.01

Table 2: Systolic and diastolic BP post Co-Q10 supplementation.

Pressure parameters (mmHg)		Co-Q_{10}	Control
		Mean±SD	
Systolic	3 month	123.88±1.12	135.59±0.97
	SE	16.28±0.62	5.15±0.22
Diastolic	3 month	80.68±0.99	86.37±1.13
	SE	8.44±0.56	2.88±0.03

DISCUSSION

Co-enzymes Q_{10} noticed to applied with direct effect on the endothelium tissues which provoking vasodilation and decline BP [11, 12]. This effects are a result of the abilities to boosting nitric oxide (NO) bio-availability and the induction of vasodilatation of vessels mostly in hypertension [12].

Moreover, Co-Q_{10} alter the angiotensin effects within Na retention and drop the levels of aldosterones [13, 14].

In spite of exciting BP data found within pre-liminary trials (both systolic and diastolic blood pressure dropped by 6 mmHg) [15]

The positive findings shown by old meta-analyses of 17 random clinical trials revealed that Co-Q_{10} supplements declined systolic BP by a great margin. Furthermore, when deal with cases that are detected with DM and IHD, and LVD, the supplement of Co-Q_{10} did not change the BP [16].

Authors concluded that antihypertensive effect of Co-Q_{10} is still unknown in cases investigated with primary HTN [17].

Nitin and colleagues concluded that the anti-oxidant enzymes super-oxide dis-mutase (SOD), catalase and glutathione per-oxidase get a role to catalyzed the reduction of oxidants in cells and give effect by counter-acting oxidative processes that lead to the reason of the chronic illnesses. The reduction in catatonia by Co-Q10 because of the antioxidant activity. They indicated that Co-Q10 must recommended as adjuvant treatment in cases who are utilizing chlorpromazine for chronic durations of time [18].

Pahari et al. [19] and Kumar et al. [20], concluded that Co-Q10 played a major role in human life. It helped to scavenge the free radicals. It has many important functions against the management of stress. Co-Q10is helpful to prevent stress in modern hectic life.

CONCLUSION

The daily administration of Co-Q10 enhance the reduction of both systolic and diastolic BP within pre-HTN cases.

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Conflict of interest

None

Funding

None

Ethics

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