Hypertension accelerates left atrial enlargement consequent to alterations in diastolic function

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Background

- Hypertension (HT) is associated with left ventricular (LV) hypertrophy, diastolic dysfunction and atrial remodelling.
- Normal aging also results in alters LV diastolic properties.
- LA remodelling is associated with the development of atrial fibrillation; HT is the most prevalent condition associated with atrial fibrillation.

Objectives

- The aim of this study was to examine changes in LA volume and phasic atrial function, per decade of life, in patients with HT compared to age matched healthy normotensive controls.

Methods

- Detailed transthoracic echocardiograms were performed:
  1. HT patients (n=122); with documented history of HT (BP>140/91mmHg and <170/110mmHg).
  2. Normal age matched controls (n=122)
   The two groups were divided into decades for analysis.
- Subjects were excluded if they had ischaemic heart disease, LVEF<55%, valvular disease or diabetes.
  Normal controls had no cardiac risk and were not on any cardioactive medications.
- Biplane LA maximum, minimum and pre ‘a’ wave volumes were measured.
- Phasic LA volumes and fractions were calculated:
  - Total emptying = LA max – LA min
  - Passive emptying = LA max - LA pre ‘a’
  - Active emptying = LA pre ‘a’ – LA min

Results

- MAP, LV mass and the E/E’ ratio were significantly increased in HT patients from decade 4 had similar LA maximum volume as normals until decade 8.
- LA maximum volume in HT patients in decade 4 was 2.8±0.3% higher in HT patients compared to age matched healthy normals.
- Active emptying was higher in HT for each decade compared to normals.
- There was no difference in passive emptying between the groups.

Conclusions

- LA maximum volume in HT patients in decade 4 was comparable to normals in decade 8. HT appears to accelerate the normal aging process with a resultant premature increase in LA volume.
- Increase in LA volume in HT patients could be due to increased LV mass, increased LV diastolic function or direct atrial changes.
- LA contraction, as measured by active emptying, is augmented in HT patients to compensate for early altered LV diastolic filling.
- The early diagnosis and effective control of blood pressure may prevent on-going diastolic changes and LA remodelling, reducing the risk of atrial fibrillation.

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