Symposium Issue: Clinical Research

Efficacy and safety of alcohol septal ablation in elderly patients: one-year outcome

Hisham Dokainish, Antoine Abchee, Ariel Delarosa, Sherif F. Nagueh, William Spencer, Nasser Lakkis

Section of Cardiology, Department of Internal Medicine, Baylor College of Medicine, Houston, Texas, USA

Objective The management of hypertrophic obstructive cardiomyopathy is not well-defined in the elderly. Medical therapy with β-blockers and calcium-channel blockers are the mainstay therapy for symptomatic patients. Myectomy is usually reserved for patients who fail medical therapy. Alcohol septal ablation has been recently introduced as an alternative therapy. Patients and Methods Ninety-five patients older than 65 years of age were included. All patients have completed one year of follow-up. The mean age was 72 ± 5 years, 47 patients were females, 10 patients with history of hypertension. Results The mean rise in CK post alcohol ablation was 1052 ± 430 IU. The mean NYHA class decreased from 2.9 ± 0.6 to 1.2 ± 0.5 (P < 0.001). The exercise duration on treadmill testing increased from 328 ± 260 s to 349 ± 39 s. The mean resting left ventricular outflow tract gradient decreased from 65 ± 37 mmHg to 16 ± 29 mmHg at one year. One patient died in the hospital after coronary artery bypass grafting that was done subsequent to spiral dissection of the left anterior descending artery during ablation. Thirteen patients developed complete heart block immediately after ablation requiring pacing therapy. Conclusions Alcohol septal ablation seems to be an effective alternative therapeutic option for elderly patients with hypertrophic obstructive cardiomyopathy. Larger studies with longer follow-up are needed. (J Geriatr Cardiol 2005;2(1):37-39).

Key words hypertrophy; cardiomyopathy; ablation; alcohol

Introduction

Hypertrophic obstructive cardiomyopathy (HOCM) is a relatively common genetic malformation of the heart, with an estimated prevalence approaching 1 in 500 of the population. Although it was once thought to affect mainly younger individuals, it is diagnosed in elderly patients with increased frequency. In fact, it has been proposed that there are three age peaks of presentation of HOCM; adolescence, the early forties, and the sixties, with an equal prevalence in both males and females in the older group. Several series comparing the clinical features of HOCM presenting in younger versus older patients found no difference in the percentage of patients with angina or syncope, but dyspnea was more common in the elderly.

The optimal treatment of older patients with HOCM is a matter of controversy. Medications such as β-blockers and calcium-channel blockers are effective in relieving symptoms in some patients. Surgical myotomy-myectomy of the septum has been reserved for patients with severe refractory symptoms despite maximal medical therapy. More recently, alcohol septal ablation (ASA) with ethanol has been shown to improve symptoms and reduce left ventricular outflow tract gradient (LVOTG) in patients with HOCM. The purpose of this manuscript is to evaluate the one-year outcome of HOCM patients older than 65 years treated with ASA for medical therapy refractory symptoms.

Methods

The investigational protocol was approved by the institutional review board of Baylor College of Medicine, and all patients gave a written consent form before participation. Ninety-five HOCM patients enrolled between November 1996 and June 2003 completed one-year follow-up. All patients had drug refractory dyspnea, asymmetric septal hypertrophy and SAM of the mitral valve, with resting echo/Doppler gradient of > 30 mmHg. A complete history and physical examination were performed before ASA along with two-dimensional echocardiograms
with Doppler. Treadmill exercise testing using the standard Bruce protocol was done in patients who were able to or agreed to exercise.

**Procedure**

Complete details of the procedure have been reported previously. In brief, on the day of the procedure, a baseline ECG was performed. Blood was collected for CK enzyme and MB isoforms both before and up to 36 hr after ASA. A temporary pacemaker was placed in the apex of the right ventricle in all except for 9 patients who already had a permanent dual-chamber pacemaker or an implantable defibrillator (ICD) with pacing capability. The septal branches supplying the septal bulge were identified. Contrast echocardiography was injected to delineate the area to be infarcted. Two to 5 ml of ethanol was injected in each septal branch. The volume of ethanol was determined according to the size of the vessel. Other septal branches were done if the gradient was not reduced to < 20 mmHg at rest, granted that other septal branches supplying the septal bulge could be identified. Patients were observed in the coronary care unit for at least 24 hr. The pacemaker lead was removed if the patient did not manifest evidence of high-degree atrioventricular block; otherwise, it was kept in place until a permanent pacemaker was implanted or the patient’s rhythm returned back to baseline. The mean length of hospital stay was 3.4 ± 1.8 days.

**Statistical analysis**

Continuous variables are presented as mean ± SD. For continuous variables, changes from preprocedure to postprocedure were evaluated by paired Student t test. Heart failure functional class was evaluated using the Wilcoxon signed rank test. A P value < 0.05 was considered statistically significant.

**Results**

**Baseline characteristics**

The mean age of the study patients was 72 ± 5 yrs (range 65-87 years). Forty-seven patients were women. Six patients had a permanent pacemaker in place prior to ASA and 3 patients had AICDs. Ten patients had a history of diagnosed hypertension and only 3 patients had history of significant coronary artery disease. All patients were receiving 2 or more medications for HOCM. Medications included β-blocker (n = 60), calcium channel blocker (n = 43) or anti-arrhythmic drugs (n = 12). The number of arteries injected was 1.3 ± 0.5 arteries per patient. The mean volume of ethanol injected was 2.3 ± 0.7 cc per artery. The mean rise in CK was 1052 ± 430 U. All patients experienced burning chest pain during alcohol injection despite premedication with meperidine and midazolam.

**Effect of ASA on symptoms and exercise tolerance**

The mean NYHA class at baseline was 2.9 ± 0.6 and it decreased to 1.2 ± 0.5 (P < 0.001) at one year. Seventy-one patients had Class III or IV New York Heart Association (NYHA) class symptoms on enrollment in the study compared to four at one year. The exercise duration on the treadmill increased from 328 ± 260 s to 394 ± 39 s at one year (P = 0.028). Five patients could not undergo treadmill testing before ASA because of severe dyspnea on presentation.

**Effect of ASA on LVOT gradient**

ASA resulted in a significant reduction of the LVOT gradient in all patients. The mean resting gradient decreased from 65 ± 37 mmHg to 16 ± 29 mmHg at one year (P < 0.001). No change was noted in the left ventricular ejection fraction at one year (69 ± 10% vs. 68 ± 5%, P = 0.74). The septal thickness was reduced from 1.9 ± 0.4 cm to 1.4 ± 0.5 cm, (P < 0.001). Mitral regurgitation was assessed by color Doppler to evaluate the size of the regurgitant jet in the left atrium on a grade of 0 for no regurgitation, 1 for mild, 2 for moderate, 3 for severe. Overall, the severity was mild to moderate at baseline in all studied patients and decreased to trivial regurgitation at one year after ASA.

**Other effects of ASA**

One patient died in hospital for spiral dissection of a calcified left anterior descending artery followed by coronary bypass surgery. Most patients had isolated premature ventricular contractions during alcohol injection. Thirteen patients developed complete heart block after ASA. Twelve patients had AICD and one patient had a dual chamber pacemaker implanted. Of those who did not have pacemakers or developed complete heart block, 62 had first degree atrioventricular block, 44 had new right bundle branch block, 12 had right bundle branch block with left anterior fascicular block and 2 had left bundle branch block.

**Discussion**

Our data suggest that ASA may be an effective therapeutic alternative in symptomatic elderly patients with HOCM who failed medical therapy. ASA resulted in a significant reduction in the left ventricular outflow obstruction, septal thickness, NYHA class and increased exercise capacity with an acceptable complication rate including one death (1%), and 14% incidence of com-
plete heart block after ASA. It is important to note that in our patients, both hypertensive and non-hypertensive patients had similar improvement in symptoms. These results compare favorably to the currently accepted surgical option for this group of patients. Similar findings were recently reported by Gietzen et al\textsuperscript{17} who showed that elderly and younger patients had a significant and similar improvement in symptoms, LVOT gradient and septal thickness after ASA. However, in their series, there was a slight decrease in left ventricular ejection fraction in the elderly patients.

Surgery for HOCM is normally reserved for patients debilitated by their symptoms, and who have high LVOT gradients despite aggressive medical therapy. Several small series reported on the surgical outcome of elderly symptomatic HOCM patients. The consensus is that 80\%\textendash;90\% sustained symptomatic improvement following septal myotomy-myectomy, along with significant reduction in the LVOT gradient. The reported peri-operative mortality is up to 5\% \textsuperscript{10,11} In a more recent series of 52 patients over age 65, the peri-operative mortality escalated to 27\% when coronary bypass grafting was performed simultaneously with myectomy.\textsuperscript{18} In our series, ASA resulted in a similar complication rate to myectomy in younger patients.

In conclusion, most information about the treatment options of HOCM are derived from young and middle aged patients. Although larger studies and longer follow-up is needed, ASA may be considered as an alternative to myectomy elderly patients.

References