Rev Port Cardiol. 2012;31(5):363–371

Revista Portuguesa de
Cardiologia
Portuguese Journal of Cardiology
www.revportcardiol.org

ORIGINAL ARTICLE

Percutaneous alcohol septal ablation for hypertrophic obstructive cardiomyopathy: Technical review and long-term clinical and echocardiographic outcomes

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Received 7 June 2011; accepted 4 November 2011
Available online 5 April 2012

KEYWORDS
Hypertrophic obstructive cardiomyopathy;
Alcohol septal ablation;
Myectomy;
Prognosis

Abstract
Background: Percutaneous septal ablation by alcohol-induced septal branch occlusion was introduced as a new treatment option in symptomatic patients with hypertrophic obstructive cardiomyopathy (HOCM). Our aim was to evaluate procedural and long-term clinical and echocardiographic outcomes in patients with HOCM treated by alcohol septal ablation (ASA) at our center.
Methods: This single-center retrospective study included 14 consecutive HOCM patients undergoing percutaneous ASA (66.4 ± 12.1 years, 71.4% female). At baseline all patients presented persistent symptoms despite optimized medical treatment, left ventricular outflow tract (LVOT) obstruction with a peak gradient >50 mmHg, systolic anterior motion of the mitral valve, and ventricular septal thickness ≥15 mm. ASA was considered successful when the LVOT pressure gradient fell to less than 50% of baseline value. All patients had echocardiographic evaluation at baseline, intraprocedure and at follow-up, and a long-term clinical follow-up (25 ± 38 months) with evaluation of functional class and occurrence of symptoms or cardiovascular events.
Results: Percutaneous ASA achieved a 71.4% acute and 85.7% long-term success rate. Peak LVOT gradient decreased from 104 ± 40 mmHg at baseline to 58 ± 30 mmHg intraprocedure ($p = 0.03$) and 35 ± 26 mmHg at follow-up ($p = 0.001$); total gradient decrease was 75 ± 43 mmHg. Ventricular septal thickness and mitral regurgitation also presented significant decreases during follow-up (from 24 ± 5 mm to 18 ± 4 mm, $p = 0.02$, and from grade 2.4 ± 0.6 to 1.4 ± 0.5, $p < 0.001$, respectively). A tendency for long-term improvement in NYHA functional class (from 2.6 ± 1.1 to 1.8 ± 1.4, $p = 0.09$) was observed. Procedural complications occurred in 6.7% of patients; two deaths and one transient ischemic attack occurred in-hospital, but no long-term clinical events were recorded.

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doi:10.1016/j.repc.2011.11.006

Conclusions: Percutaneous ASA is an effective treatment for symptomatic patients with HOCM, obtaining a marked decrease in LVOT pressure gradient and symptomatic improvement. Despite the occurrence of a significant number of procedural complications, the favorable long-term outcomes underline the potential of ASA as a percutaneous alternative to surgical myectomy.

PALAVRAS-CHAVE
Cardiomiopatia hipertrófica obstrutiva;
Ablação septal alcoólica;
Miectomia;
Prognóstico

Ablação septal alcoólica percutânea na cardiomiopatia hipertrófica obstrutiva: revisão da técnica e resultados clínicos e ecocardiográficos a longo-prazo

Resumo
Objetivos: A ablação septal percutânea por indução alcoólica da oclusão de ramos coronários septais foi introduzida como uma nova opção terapêutica em doentes com cardiomiopatia hipertrófica obstrutiva (HOCM) sintomática. O nosso objetivo foi a avaliação dos resultados clínicos e ecocardiográficos agudos e a longo-prazo em doentes com HOCM tratados por ablação septal alcoólica (ASA) no nosso centro.
Métodos: Estudo monocêntrico, retrospetivo incluindo 14 doentes consecutivos com HOCM submetidos a ASA percutânea (66,4 ± 12,1 anos, 71,4% sexo feminino). Todos os doentes apresentavam basalmente sintomas persistentes apesar de terapêutica médica otimizada, obstrução da câmara de saída do ventrículo esquerdo (LVOT) com gradiente máximo >50 mmHg, movimento sistólico anterior da válvula mitral e espessura do septo interventricular ≥15 mm. A ASA foi considerada bem sucedida quando o gradiente do LVOT diminuiu para menos de 50% do valor inicial. Todos os doentes foram submetidos a avaliação clínica e ecocardiográfica basal, intraprocedimento e durante o seguimento, com avaliação da classe funcional e ocorrência de sintomas ou eventos cardiovasculares a longo-prazo (25 ± 38 meses).
Resultados: A ASA percutânea obteve uma taxa de sucesso de 71,4% e 85,7%, respetivamente aguda e a longo-prazo. O gradiente máximo do LVOT diminuiu de 104 ± 40 mmHg basais para 58 ± 30 mmHg intraprocedimento (p = 0,03) e 35 ± 26 mmHg a longo-prazo (p = 0,001); o decréscimo total do gradiente foi de 75 ± 43 mmHg. Também a espessura do septo interventricular e a regurgitação mitral apresentaram uma diminuição significativa durante o seguimento (de 24 ± 5 mm para 18 ± 4 mm, p = 0,02, e de grau 2,4 ± 0,6 para 1,4 ± 0,5, p < 0,001, respetivamente). Uma tendência para a melhoria a longo-prazo da classe funcional NYHA (de 2,6 ± 1,1 to 1,8 ± 1,4, p = 0,09) foi observada. Complicações do procedimento ocorreram em 6,7% dos doentes; duas mortes e um acidente isquémico transitório ocorreram no hospital, não se registando eventos clínicos a longo-prazo.
Conclusões: A ASA percutânea é uma terapêutica eficaz para doentes sintomáticos com HOCM, obtendo uma acentuada diminuição do gradiente de pressão do LVOT e melhoria sintomática. Apesar da ocorrência de um número significativo de complicações periprocedimento, o favorável prognóstico a longo-prazo sublinha o potencial da ASA como uma alternativa percutânea à miectomia cirúrgica.

Introduction

Hypertrophic obstructive cardiomyopathy (HOCM), first described in the late 1950s, is now recognized to be a primary autosomal dominant myocardial disorder characterized by a dynamic narrowing of the left ventricular outflow tract (LVOT), secondary to asymmetrical septal hypertrophy and systolic anterior motion of the mitral valve. The consequent reduction in cardiac output is responsible for the typical symptoms of dyspnea, angina pectoris and stress-induced syncope, with increased risk for sudden cardiac death in some patients.[1]

Treatment of patients with symptomatic HOCM aims to reduce functional disability and the extent of outflow tract obstruction and to improve diastolic filling and survival in a disease with a mortality rate estimated at 3–4% per year.[2] Administration of negatively inotropic drugs is the treatment of first choice, and succeeds in improving functional capacity and symptoms in a high percentage of patients. However, 5–10% of patients with marked LVOT obstruction have severe symptoms unresponsive to medical therapy.[3] Such patients have traditionally been referred for surgical myectomy of the basal septum, which has been the gold standard treatment for decades. This procedure relieves left ventricular (LV) outflow obstruction, providing long-term symptomatic and outcome improvement in most patients, with a mortality of 1–2% in experienced centers.[4]

Percutaneous alcohol septal ablation (ASA) has emerged as a novel interventional treatment option during the last decade.[5] This technique, in which ethanol is injected into