

INTRODUCTION

Hypertrophic cardiomyopathy is the most common inherited myocardial disorder. The characteristic left ventricular hypertrophy (LVH) results in a resting or exercise provoked left ventricular outflow tract (LVOT) obstruction in 70% of patients, therefore the term hypertrophic obstructive cardiomyopathy (HOCM) is commonly used. For symptomatic patients who have failed the first line pharmacologic treatments, surgical myectomy and alcohol septal ablation (ASA) are two procedures that can reduce the LVOT obstruction and improve New York Heart Association (NYHA) functional class.

Surgical myectomy has been performed for decades and involves direct removal of the septal muscle. Complications of the procedure include a ventricular septal defect, a left bundle branch block, or complete heart block necessitating a permanent pacemaker. Because myectomy requires a thoracotomy, patients often desire a less invasive procedure. Alcohol septal ablation (ASA) is performed percutaneously as part of a cardiac catheterization. During the procedure, ethanol is injected into a branch of a septal perforator coronary artery to create a localized myocardial infarction and subsequent septal remodeling over time. Complications of ASA include coronary artery dissection, large myocardial infarction, complete heart block, and ventricular tachyarrhythmias. ASA has also been associated with an increased risk of residual LVOT gradient requiring a repeat septal reduction procedure.

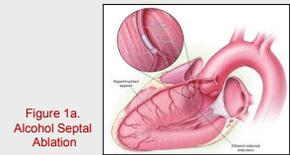


Figure 1a. Alcohol Septal Ablation

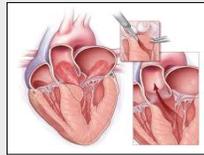


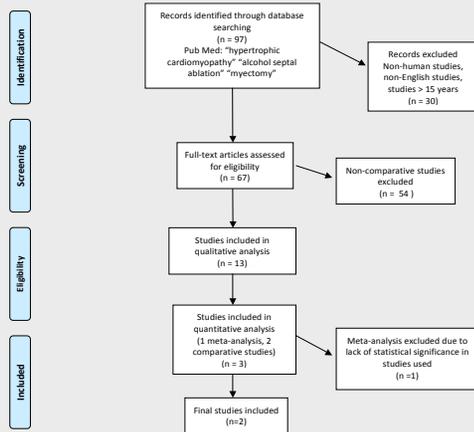
Figure 1b. Surgical Myectomy

CLINICAL QUESTION

- P. In patients with symptomatic hypertrophic obstructive cardiomyopathy
- I. Does alcohol septal ablation
- C. Compared to surgical myectomy
- O. Decrease symptoms and improve long term outcome

Clinical Scenario: A 55 year old male with diagnosed hypertrophic obstructive cardiomyopathy (HOCM) is severely symptomatic despite pharmacologic treatment. Is a septal myectomy or alcohol ablation the best procedure for this patient?

METHODS



RESULTS

Study 1: Perioperative Complications and Long-Term Outcome After Alcohol Septal Ablation Versus Surgical Myectomy in Hypertrophic Obstructive Cardiomyopathy

Study Design: A non-randomized, observational study of myectomy and ASA procedures performed between 1981 and 2010 at a Netherland hospital. 161 patients underwent ASA and 102 required myectomy

Inclusion Criteria: Patients severely symptomatic despite medical therapy with a resting gradient of 30 mmHg or a provocative gradient of 50 mmHg. Patients with CAD or subvalvular disease in addition to HOCM were required to have myectomy, all other patients chose between ASA and myectomy.

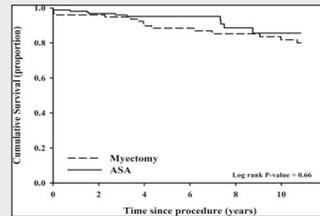


Figure 2. Survival after ASA versus Myectomy

Study Results:

- Long term survival was comparable after ASA and myectomy
- ASA was associated with a lower frequency of perioperative complications and a shorter hospital stay compared with myectomy
- The need for pacemaker implantation was comparable in both procedures
- Patients undergoing ASA had a lower frequency of perioperative complications
- At long term follow-up, echocardiogram resting gradients were slightly higher for ASA patients compared to myectomy
- The occurrence of sudden cardiac death (SCD) was comparable and uncommon both after ASA and myectomy

Study 2: Outcome of Patients with Hypertrophic Obstructive Cardiomyopathy After Percutaneous Transluminal Septal Myocardial Ablation and Septal Myectomy Surgery

Study Design: A non-randomized cohort study of surgical myectomy and ASA procedures performed between 1994 and 2000 in Cleveland, Ohio. A total of 51 symptomatic patients with hypertrophic obstructive cardiomyopathy were included; 26 were treated by myectomy and 25 by ASA.

Inclusion Criteria: Patients had a non-dilated, hypertrophied left ventricle, angina, dyspnea, or syncope, and a New York Heart Association (NYHA) Functional class of at least III. Additionally, patients had a left ventricular outflow tract (LVOT) gradient \geq 50 mmHg and were refractory to drug treatment.

Study Results:

- The reduction of LVOT pressure gradient (PG) was more complete in those undergoing myectomy (Fig. 3)
- Both myectomy and ASA reduced the hypertrophied septum and decreased LVOT obstruction significantly
- Both myectomy and ASA improved NYHA Class, thereby improving patient's symptoms from "limitation of activity due to symptoms" to either mild symptoms or no symptoms (Fig. 4)
- The hospital stay was shorter in those undergoing ASA

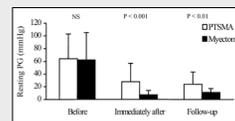


Figure 3. Comparing average PG between percutaneous transluminal septal ablation (PTMA) and myectomy. *PTMA=ASA

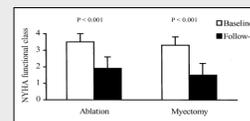


Figure 4. Improvements in New York Heart Association (NYHA) functional class after ASA and myectomy in patients with HOCM.



Cross sectional view and ultrasound image of the hypertrophied left ventricle characteristic of HOCM

CONCLUSIONS

Study 1: Complications and Outcomes

	Myectomy (n= 102)	ASA (n= 161)	P value
Perioperative complications	28%	14%	0.004
Length of hospital stay, days	9 (6-12)	5 (4-6)	< 0.001
Post-operative gradient, mmHg	12 (8-20)	10 (0-20)	< 0.001
Late follow up gradient, mmHg	9 (4-10)	10 (7-9)	0.003
Reintervention within long term follow up	1%	6.3%	0.055

Study 2: Complications and Outcomes

	Myectomy (n= 26)	ASA (n= 25)	P value
Resting pressure gradient, mmHg	<u>Before procedure</u> 62 \pm 43	<u>Before procedure</u> 64 \pm 39	< 0.0001
	<u>3 month follow-up</u> 11 \pm 6	<u>3 month follow-up</u> 24 \pm 19	
NYHA Functional Class (1-4)	<u>Before procedure</u> 3.3 \pm 0.5	<u>Before procedure</u> 3.5 \pm 0.5	< .001
	<u>3 month follow-up</u> 1.5 \pm 0.7	<u>3 month follow-up</u> 1.9 \pm 0.7	
Length of hospital stay, days	8.1 \pm 3.5	5.6 \pm 2.3	0.01
Post procedural complications	• No deaths • 16 pts with LBBB	• No deaths • 2 pts with LBBB • 9 pts with RBBB	> 0.05
Permanent pacemaker required after procedure	7.7%	24%	> 0.05

In summary, long term survival and symptomatic improvement after both ASA and myectomy is comparable. ASA is associated with decreased length of hospital stay following the procedure as well as a decreased rate of perioperative complications. Because ASA is a less invasive procedure than surgical myectomy, it should be considered when choosing HOCM surgical treatment. However, surgical myectomy may be necessary if the patient has multivessel coronary artery disease or if septal anatomy is unsuitable for ASA. For our clinical scenario, the 55yo patient should meet with his cardiologist and surgeon to ensure that his personal preference is taken into consideration in addition to his individual cardiovascular history.

REFERENCES

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