

Healthy Heart

Volume-4 | Issue-42 | May 5, 2013

Price : ₹ 5/-

Honorary Editor :
Dr. Milan Chag



From the desk of Honorary Editor:

Percutaneous Transluminal myocardial septal ablation (PT SMA) has emerged as a less invasive treatment of symptomatic patients with hypertrophic obstructive cardiomyopathy (HOCM). In the past decade, the availability of this sophisticated technique has revived the interest of cardiologists in left ventricular outflow tract obstruction, which has led to the recognition that most patients with hypertrophic cardiomyopathy (HCM) have the obstructive type. Follow-up studies have already shown the safety and efficacy of the procedure, which offers symptomatic relief in most patients. Long-term survival is comparable to historical reports after surgical myectomy. Complications are rare and can be further reduced by an increase in the experience of the operators, while the theoretical concern for possible ventricular arrhythmogenicity caused by the myocardial scar has not been documented by the existing data. Although there are still no randomised trials, percutaneous septal ablation is a viable alternative for patients with HOCM. We have one of the largest series of such therapy in India (Table-4).

- Dr. Milan Chag

HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY: ALCOHOL SEPTAL ABLATION- A PROVEN THERAPY NOW!

INTRODUCTION AND SALIENT FEATURES:

◆ Hypertrophic cardiomyopathy (HCM) is a primary myocardial disorder which is clinically defined by the presence of unexplained left ventricular hypertrophy (Figure-1 & 2).

Figure-1

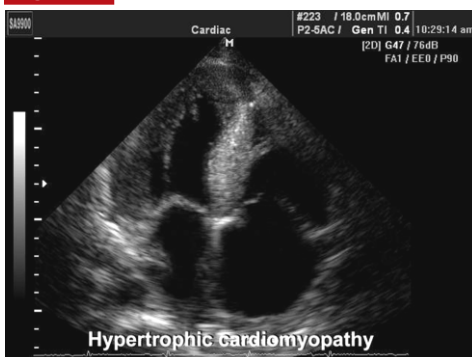
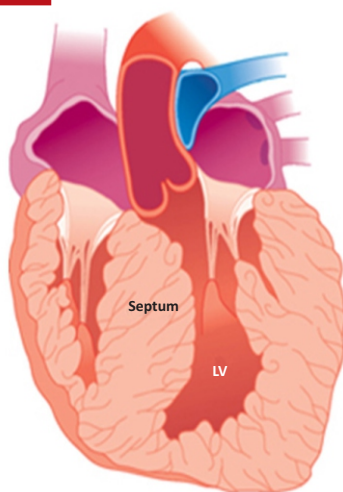


Figure-2



- ◆ It is inherited as an autosomal dominant trait with variable penetrance, most commonly involving sarcomeric protein mutations.
- ◆ The most common genetic cardiac disease, affecting 1 in 500 individuals.
- ◆ The disease can be diagnosed in patients of all ages and presents as asymptomatic individual to patients with severe symptoms of exertional dyspnoea or angina and reduced exercise capacity.
- ◆ The natural history of the disease may be highly heterogeneous with life expectancy ranging from normal longevity to sudden arrhythmic death (Table 1), often presenting at a young age, or evolution to congestive heart failure or stroke.
- ◆ Most patients present a characteristic left ventricular morphology with hypertrophy of the basal interventricular septum that is coupled with systolic anterior motion (SAM) of the anterior mitral

Cardiologists

Dr. Ajay Naik (M) +91-98250 82666 Dr. Milan Chag (M) +91-98240 22107
 Dr. Satya Gupta (M) +91-99250 45780 Dr. Urmil Shah (M) +91-98250 66939
 Dr. Vineet Sankhla (M) +91-99250 15056 Dr. Hemang Baxi (M) +91-98250 30111
 Dr. Gunvant Patel (M) +91-98240 61266 Dr. Anish Chandarana (M) +91-98250 96922
 Dr. Keyur Parikh (M) +91-98250 26999

Pediatric Cardiologists

Dr. Kashyap Sheth (M) +91-99246 12288 Dr. Milan Chag (M) +91-98240 22107

Cardiothoracic & Vascular Surgeons

Dr. Dhiren Shah (M) +91-98255 75933
 Dr. Dhaval Naik (M) +91-90991 11133
 Dr. Dipesh Shah (M) +91-90990 27945

Pediatric & Structural Heart Surgeons

Dr. Shaunak Shah (M) +91-98250 44502

Vascular & Endovascular Surgeon

Dr. Srujal Shah (M) +91-91377 88088

Cardiac Anaesthetists

Dr. Niren Bhavsar (M) +91-98795 71917
 Dr. Hiren Dholakia (M) +91-95863 75818
 Dr. Chintan Sheth (M) +91-91732 04454

Neonatologist and Pediatric Intensivist

Dr. Amit Chitaliya (M) +91-90999 87400

Cardiac Electrophysiologist

Dr. Ajay Naik (M) +91-98250 82666

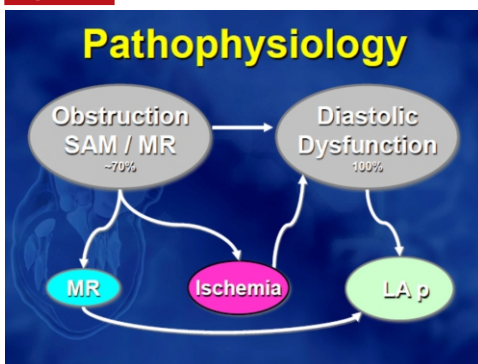
Table-1 Risk Factors For Sudden Cardiac Death

1. Familial sudden death
2. Unexplained syncope
3. Multiple, repetitive NSVT (Holter)
4. Abnormal exercise response
5. Massive LVH (Septal thickness > 30 mm)
6. Cardiac arrest survivors
7. Documented sustained ventricular tachycardia

valve leaflet and leads to dynamic left ventricular outflow tract (LVOT) obstruction and mitral regurgitation due to malcoaptation of the mitral leaflets.

- ◆ Symptomatic status depends on left ventricular obstruction, diastolic dysfunction and myocardial ischaemia. The existence of significant obstruction at rest or after provocation is associated with symptomatic status and has significant prognostic implications. (Figure-3)

Figure-3



MANAGEMENT:

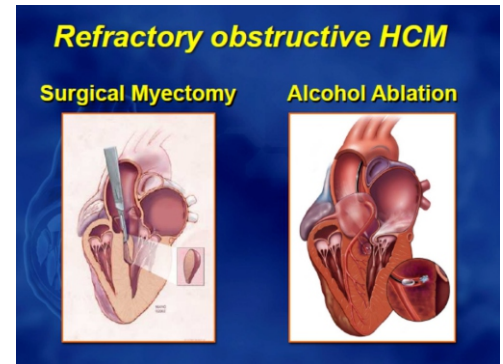
- ◆ In general, treatment of patients with hypertrophic cardiomyopathy

aims at relieving symptoms, reducing the risk of sudden death and offering genetic counselling.

- ◆ Consequently, treatment of symptomatic patients with obstructive HCM (HOCM) aims at the reduction of the pressure gradient. Medical treatment with β -blockers, disopyramide or verapamil, however, fails to relieve symptoms in a substantial subset of patients.
- ◆ In such drug-refractory patients, alcohol septal ablation (Percutaneous Transluminal Septal Myocardial Ablation-PTSMA) (Figure-4) has come forward as a less invasive treatment than surgery to reduce LVOT obstruction by creating

an infarction limited to the part of the septum, either basal or mid-cavitary, involved in the development of LV obstruction (Table-2).

Figure-4



PROCEDURE (PTSMA)

- ◆ Under local anesthesia and prophylactic transjugular temporary pacemaker lead insertion, first septal artery is identified and OTW

Table-2 : INDICATIONS FOR SEPTAL REDUCTION (PTSMA) TREATMENT:

CLINICAL INDICATION

- ◆ Symptomatic patients
 - Drug-refractory or severe side effects of drugs
 - Functional class III and IV or functional class II with objective exercise limitations
 - Recurrent exercise-induced syncope
- ◆ Failure of prior myectomy or pacemaker
- ◆ Comorbidity-related increased surgical risk

HAEMODYNAMIC INDICATION

- ◆ Intracavitary gradient >30 mmHg at rest and/or
- ◆ Provocable gradient >60 mmHg

MORPHOLOGIC INDICATION

- ◆ Echocardiography
 - Subaortic, SAM-associated gradient
 - Mid-cavitary gradient
 - Exclusion of intrinsic mitral valve apparatus disorders
- ◆ Coronary angiography
 - Suitable septal branch

balloon catheter of appropriate size is placed over the guide wire in the artery to occlude it completely. After confirming the target septal tissue by contrast echocardiography, 1 to 3 ml of absolute alcohol (1 ml/ 1 cm of IVS) is injected in target septal artery through central lumen of OTW balloon catheter under continuous ECG and hemodynamic monitoring. At the end, balloon catheter is removed, check angiogram is done and patient is monitored in CCU for 48 hours. (Figure-5, 6)

Figure-6 : Procedure (PTSMA)

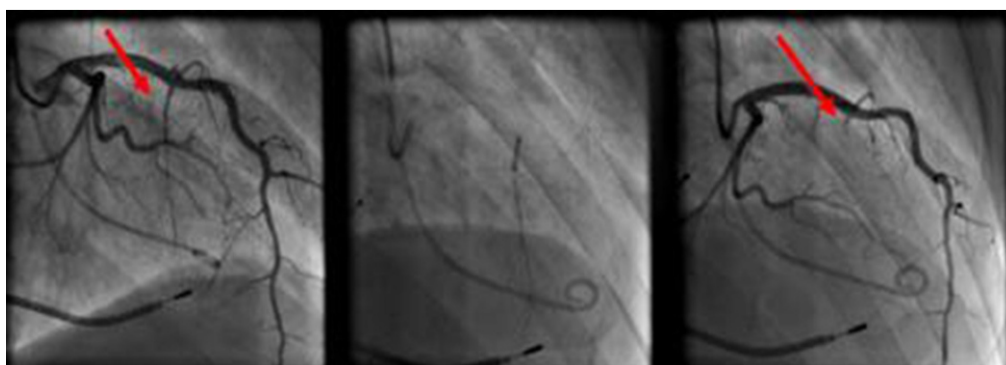


Figure-7

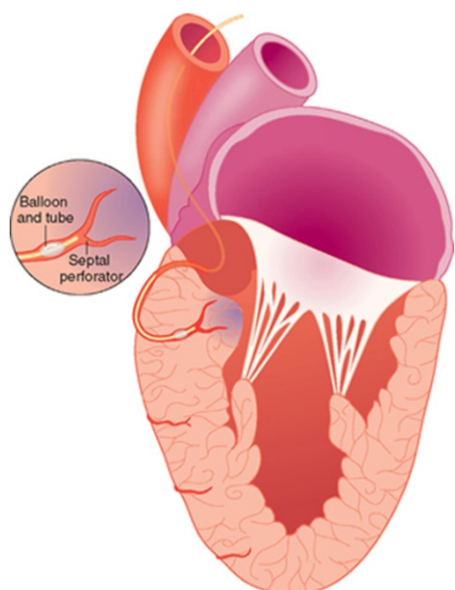
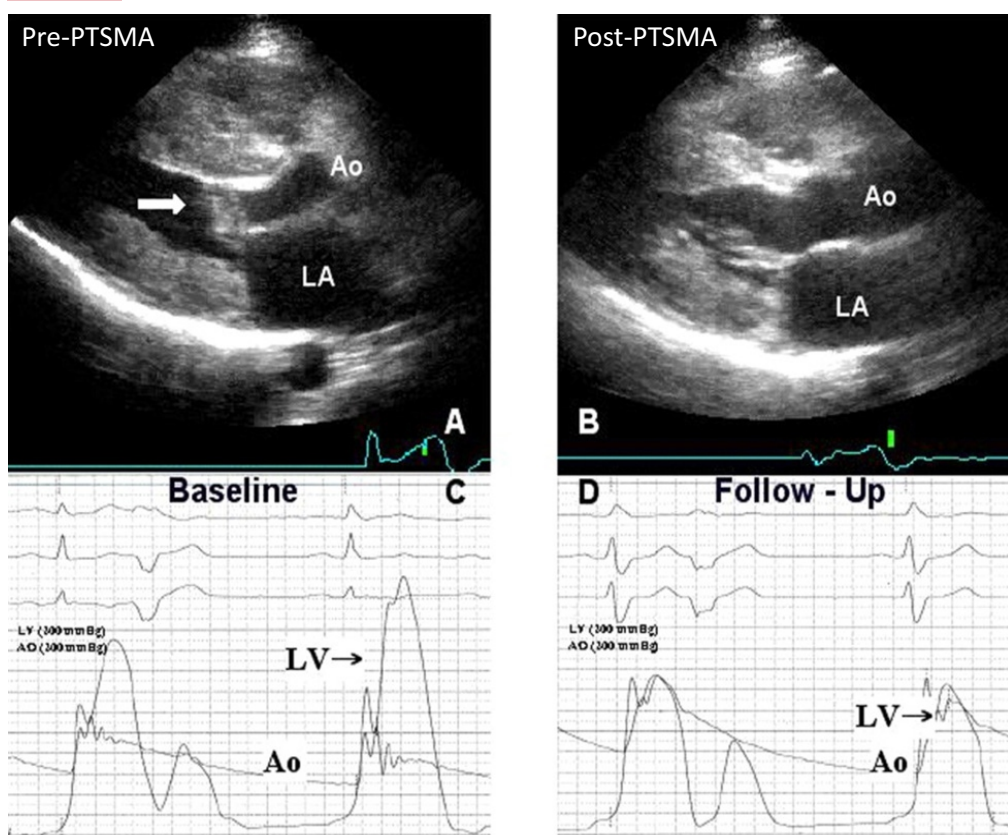


Figure-5 : Procedure (PTSMA)

PATHOPHYSIOLOGICAL EFFECTS OF SEPTAL ABLATION:

- ◆ Injection of alcohol during alcohol ablation causes coagulative necrosis of the myocardium and the septal arteries.
- ◆ Tissue oedema appears early in this process, while muscle replacement

Figure-8

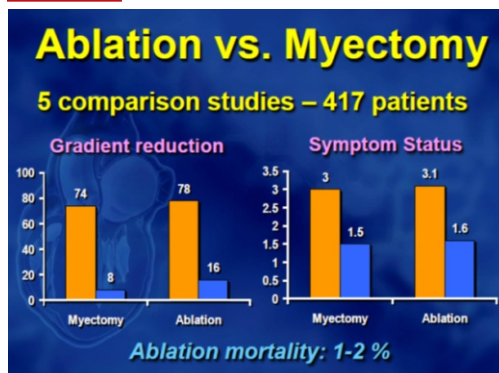
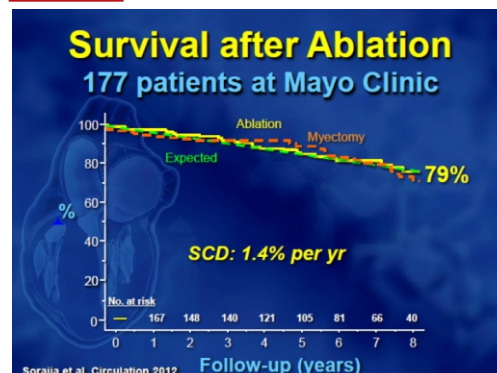


Figure-9



by scar formation develops only after several days.

- ◆ Thinning of the ablated area and scar formation lead to a permanent and significant reduction of the obstruction and the associated mitral regurgitation within the next 3-12 months.

CLINICAL RESULTS

- ◆ Haemodynamic success with reduction in both resting and provokable gradients is accomplished in $\geq 90\%$ of patients and is associated with significant improvement in symptoms (Figure-7,8).
- ◆ Mean NYHA class decreased from 2.9 to 1.2 and mean CCS class decreased from 1.9 to 0.4 at 1-year follow-up. Exercise capacity also improved on a treadmill from 325.3 to 437.5 seconds. In a cohort of the first 100 consecutive patients treated the overall survival was 96%

Table-3 : Comparison of Septal Myectomy and Percutaneous Alcohol Septal Ablation

Parameter	Percutaneous Alcohol Septal Ablation	Surgical Myectomy
Invasiveness	Percutaneous groin access	Sternotomy
Onset of reduction in LVOT gradient	Some decrease in gradient instantly, but 6-12 months for full effect	Instantaneous
Success rate (%)	>80	>95
Procedural mortality (%)	1-2	0-2
Recovery time	2-4 days	1 week
Effect on LVOT gradient	Decreases to <25 mm Hg	Decreases to <10 mm Hg
Postprocedure conduction abnormality	Right bundle branch block	Left bundle branch block
Need for permanent pacemaker-all patients (%)	5-10%	3-10
Need for permanent pacemaker if no preexisting conduction abnormalities (%)	5%	2%
Length of follow-up (year)	6-8	30-40

at 8 years, while 74% of patients remained free of severe symptoms, atrial fibrillation, and stroke or ICD implantation. Results of last 12 years are comparable to published literature (Table-3, Figure-9)

CONCLUSIONS

Alcohol septal ablation has emerged in the last 15 years as a less invasive

alternative to the standard surgical treatment of symptomatic patients with HOCM. The accumulated long-term results have shown an ongoing relief of symptoms in the majority of patients. Hospital mortality can be practically eliminated in experienced centers, while the need for permanent pacing has also been reduced with increased experience.

Table-4 : Results

STUDY	NO. OF PATIENTS	AGE (YEARS)	PACEMAKER IN-HOSPITAL (%)	MEN FOLLOW-UP TIME (YEARS)	IN-HOSPITAL MORTALITY (%)	LONG-TERM ALL-CAUSE MORTALITY (%)	REDO PROCEDURES (%)	MYECTOMY (%)	SURVIVAL	SURVIVAL WITHOUT SYMPTOMS
Seggewiss 2007	100	52.7±15.7	8	4.8±1.2	1	3			96%@8y	74 %
Welge 2008	347	54±15	7	4.8±2.9	1	8	5	3	92%	74 %
Sorajja 2008	138	64±21	20	2.2±2.8	1.4	8	4		88%@4y	76.4 %
Kuhn 2008	329	58±15	17	2.1	1.8	7	13		91.1%	
Fernandes 2008	619	53.9±15.0	8.2	4.6±2.5	1	8	14	25	89%@8y	
Kwon 2008	55	63±13	25.5	8±1	0	24	5.5	5	76%@10y	
Noseworthy 2009	89			5.0±2.3		9	10	11	91%	
Ten Cate 2010	91	54±15	4	5.4±2.5	2	10	5	5	88%	
Lyne 2010	12	69±22	0	11.75	0	3	17	0		73%@10y
Chag MC 2013	30	48±12	1/30	5.8	0	0	0	0	100 %	80 %

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Printed, Published and Edited by Dr. Keyur Parikh on behalf of the CIMS Hospital
Printed at Hari Om Printery, 15/1, Nagori Estate, Opp. E.S.I. Dispensary, Dudheshwar Road, Ahmedabad-380004.
Published from CIMS Hospital, Nr. Shukan Mall, Off Science City Road, Sola, Ahmedabad-380060.