



A Malignant Myocardial Bridge

A 65 year old male with hypertension and non-obstructive Hypertrophic Cardiomyopathy (HCM) presented with severe life style limiting angina and class III dyspnea on exertion. He was unable to walk even a few steps particularly after a meal.

His echo revealed presence of severe asymmetrical septal hypertrophy (20 mm) but no SAM. There was no significant gradient across the LVOT even after provocation by Valsalva manoeuvre or a full meal. There was no symptomatic relief with beta blockers.

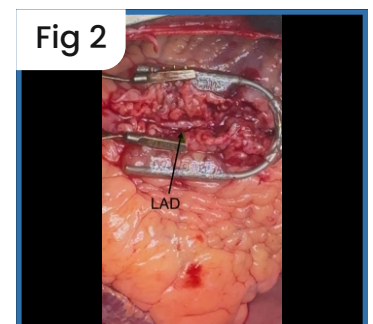
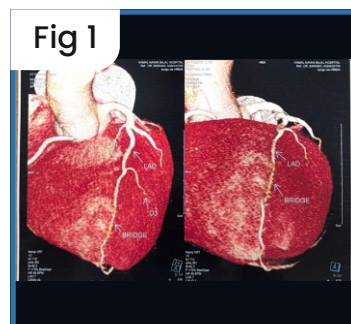
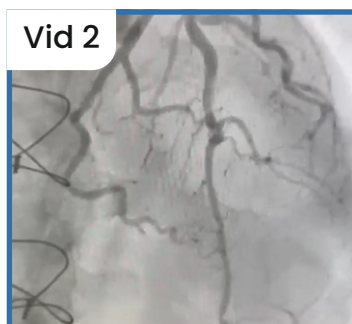
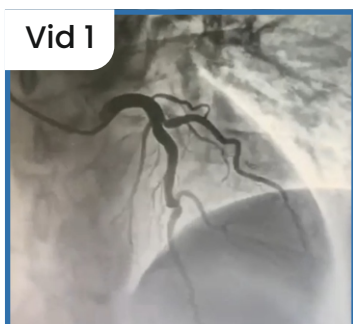
A CT coronary angiogram revealed presence of myocardial bridge at 2.5 mm depth (Fig 1). A conventional coronary angiogram revealed presence of a long myocardial bridge in LAD that was causing severe systolic obliteration of the lumen in proximal and mid segment (Video 1).

After discussing various treatment options he finally underwent surgical unroofing of the LAD (supra arterial myotomy) (Fig 2, arrow shows unroofed LAD). The results of surgery were dramatic with almost complete resolution of symptoms. A post-operative coronary angiogram revealed an almost normal looking LAD with no systolic compression in systole (Video 2).

The options for treating symptomatic myocardial bridges are as follows:

1. Medical management with negative inotropes like beta blockers or non-dihydropyridene calcium channel blockers like Diltiazem
2. Supra-arterial myotomy (surgical unroofing)
3. Coronary artery bypass surgery
4. Coronary stenting

Surgical unroofing (supra-arterial myotomy) is currently regarded as the preferred invasive treatment for patients with a hemodynamically significant myocardial bridge who remain symptomatic despite optimal medical therapy.



Symptomatic Outcomes

Most contemporary surgical series report:

- 70–95% complete or near-complete relief of angina
- Significant improvement in exercise tolerance
- Marked reduction in antianginal medication requirements
- Sustained benefit over several years of follow-up

Several series from high-volume centers have shown that the majority of patients remain free of recurrent angina at 3–10 years.

Objective Improvement

Postoperative studies frequently demonstrate:

- Elimination or major reduction of systolic compression on angiography.
- Improvement in coronary flow reserve.
- Improvement in stress-induced ischemia.
- Normalization of invasive physiological indices in many patients.

Operative Mortality and Safety

In experienced centers:

- Operative mortality is very low (<1% in most modern series).
- Serious complications are uncommon.
- Most patients have an uncomplicated recovery.

Potential Complications

Although generally safe, complications can include:

- Right ventricular perforation during deep myotomy.
- Bleeding.
- Ventricular aneurysm formation (rare).
- Residual bridge if the myotomy is incomplete.
- Recurrent symptoms despite technically successful surgery.

Predictors of Good Results

Patients tend to benefit most when:

- Symptoms are clearly attributable to the bridge.
- Objective ischemia is demonstrated.
- There is significant systolic compression (>70–75%).
- The bridge is not associated with other dominant causes of chest pain.

Deep or Long Bridges

For very deep (>5 mm) or extensive bridges, surgery may be technically more challenging. Some surgeons may consider CABG in selected cases, although graft patency can be compromised by competitive flow. Consequently, many centers still favor complete unroofing whenever feasible.

Representative Contemporary Data

Experience from centers such as Stanford University Medical Center and Cleveland Clinic has shown:

- Excellent perioperative safety.
- Durable symptomatic relief in the large majority of patients.
- Better long-term outcomes than have generally been reported with coronary stenting.

The role of stenting for a myocardial bridge has become very limited over the years because long-term outcomes have generally been disappointing. Stenting is associated with high rate of restenosis (20–50%), stent fracture, coronary perforation and rarely stent thrombosis. It is reserved only for highly symptomatic patients who are poor surgical candidates.

CABGS is considered in patients with long or deep (> 5 mm) bridges. However graft patency may be compromised by competitive flow.

Practical Take-Home Message

For a patient with:

1. Persistent symptoms despite beta-blockers/calcium-channel blockers,
2. Objective evidence of ischemia attributable to the bridge, and
3. Suitable anatomy,

Surgical unroofing is generally considered the most effective and durable invasive treatment, with symptom relief in approximately 80–90% of properly selected patients and a very low operative mortality when performed in experienced centers.

Note: We thank our surgeon Dr. Sarang Agnihotri for successful surgery and lending us the surgical photographs



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