

**Case Report**

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# Combined Percutaneous Intervention of Coronary Artery Disease and Atrial Septal Defect



**Sherief Sulaiman\***

*Department of cardiology, Kerala University of health sciences, India*

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**\*Corresponding author:** Sherief Sulaiman, Kerala University of Health Sciences, Department of Cardiology, Super speciality block government medical college, Calicut, Kerala, India, Tel: 919562044472; Email: sherifmd.18@gmail.com

## Abstract

We report a case of successful combined percutaneous intervention in a middle aged female with coronary artery disease (CAD) and atrial septal defect (ASD). The case demonstrates the feasibility and safety of performing combined PTCA and ASD device closure in selected patients. Successful combined procedure obviates the need for major surgery and repeated hospitalizations and an effective alternative for patients at high surgical risk.

## Introduction

Coronary artery disease is the leading cause of death worldwide. In contrast to the trend seen in developed countries, mortality from CHD is expected to increase in developing countries, from an estimated 9 million in 1990 to a projected 19 million by 2020 [1,2]. Percutaneous transluminal coronary angioplasty (PTCA) is the established standard treatment modality for patients with symptomatic CAD and the number of patients undergoing PTCA is on the rise. Atrial septal defect is among the most commonly encountered congenital heart diseases in adults. ASD has a distinctly prolonged symptom free period and is often detected incidentally in adults. The safety and efficacy of percutaneous device closure of ASD is well established and is shown to improve cardiac function even in asymptomatic patients [3]. Patients with complex CAD and ASD often undergo surgical correction. Few cases of combined percutaneous intervention have been reported in patients with non-complex CAD.

## Case Report

A 56 year old female with history of long standing diabetes mellitus and hypertension presented with symptoms of NYHA class II exertional angina and dyspnoea. The patient had no history of acute coronary syndrome in the past. On examination, the patient had a widely fixed second heart sound and a grade II ejection systolic murmur at left upper sternal border. On evaluation, her echocardiography revealed a 15 x 12mm ostium secundum ASD shunting left to right. The defect was central and had adequate rims all around. The right atrium and right ventricle were dilated

suggesting volume overload. In addition, there was hypokinesia of basal and mid segments of anterior and anterolateral wall with preserved myocardial thickness. The calculated ejection fraction was 55%. She had grade I diastolic dysfunction and mild pulmonary artery hypertension. Her coronary angiogram (CAG) revealed a diffuse 95% lesion extending from the ostio-proximal segment of left anterior descending artery with a faint ante-grade flow and a diffuse 80% lesion in the mid-segment of right coronary artery. As the patient was unwilling to undergo coronary artery bypass surgery with surgical closure of ASD, a combined percutaneous intervention for CAD and ASD was planned.

## Procedure Notes

Under local infiltrative anesthesia, the right femoral artery access was taken and secured with a 7Fr sheath. An intravenous bolus injection of 5000U of unfractionated heparin. The left coronary was selectively intubated with a 7Fr guide catheter (Judkins left, JL 3.5 launcher). After crossing the LAD lesion, the middle segment of LAD was stented with a 3x38mm drug eluting stent (DES) (Promus element, Boston scientific, USA). The ostial LAD lesion was addressed by Left main to LAD stenting with a 4x8mm DES (Xience prime, Abbott vascular, USA). Subsequently the middle segment of RCA was stented with a 3x32mm DES (Yukon choice flex, Translumina therapeutics). The right femoral venous access was taken. The mean pulmonary artery and wedge pressures were recorded as 30 and 11mmHg respectively. Thereafter, under guidance of transthoracic echocardiography and fluoroscopy, the atrial septal defect was closed with a 16mm

Amplatzer septal occluder (St. Jude Medical). The catheters and sheaths were removed and hemostasis achieved. The procedure was well tolerated and no signs of LV failure were observed. The total fluoroscopy time was 34mins and the total contrast volume used was 250ml. The patient was discharged after 24 hours. At 1 year follow up, the patient is asymptomatic and transthoracic echocardiography showed stable device position with no residual shunt.

### Discussion

Co-existence of CAD and ASD is rare. However, the relatively long asymptomatic course of ASD allows patients to reach adulthood without symptoms or without being treated. In addition, with the rapidly increasing incidence of CAD, a patient with a combination of ASD and CAD may occasionally be encountered. The incidence of significant CAD in ASD/PFO was reported to be about 22% [4]. CABG and ASD closure is a major surgical procedure with its attendant morbidity. Very few reports of combined percutaneous procedure are available in the literature. Sequential ASD device closure and PTCA have been reported with ASD closure before [5] or after [6] PTCA. Successful combined procedure was later reported by Yalonetsky et al. [7]. It is to be emphasized that careful patient selection is needed before subjecting the patient to such combined procedures. As patients with significant multi vessel CAD are more likely to have LV dysfunction, it is mandatory to thoroughly evaluate LV systolic and diastolic function by echocardiography and by catheterisation if needed. In cases of borderline LV function, balloon occlusion test may be carried out prior to the procedure. In a case reported by Tomai et al. [8], the patient developed pulmonary edema following ASD closure and the authors opinion was that the transcatheter closure of atrial septal defect should be deferred in patients with associated ischemic heart disease suitable for coronary revascularization. It is intuitive that it is better to carry out PTCA first followed by ASD closure, as revascularisation is expected to improve the contractility of the ventricle and may

potentially prevent the occurrence of pulmonary edema following ASD closure.

Our case demonstrates the feasibility of carrying out simultaneous percutaneous intervention of complex CAD and ASD device closure. To our knowledge, this is the first reported case where LM-LAD stenting is done as a part of the combined procedure. The major advantage to the patient is that such combined procedure obviates the need for repeated hospitalizations/major surgery/General anesthesia. Further, combined percutaneous intervention is a viable alternative for patients at high surgical risk.

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