

Staged inflation: An approach with achievement of optimal luminal gain and reduced rate of spontaneous coronary artery dissection

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Editorial

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Introduction

Nowadays, interventional cardiology brought a great success to the treatment of many cardiovascular disorders. Despite these great beneficial effects, it has side effects related to the applied techniques. Among them, inflation pressure and pattern of inflation play fundamental role in this regard. By low and very high inflation pressures, the rate of stent thrombosis and in-stent restenosis becomes very high even with the use of anti-platelets agents.¹ Stent edge dissection, coronary rupture, and intima/media rupture are seen commonly by inflation at very high pressure or in distal side of long stents with diameter discrepancy between proximal and distal parts. These events could occur even by application of nominal pressure.^{1,2} Currently, high pressure stent inflation is applied by many interventional cardiologists due to the more immediate luminal gain and decreased rate of sub-acute stent thrombosis.² However, application of high pressure brings greater rate of dissection and vessel trauma.¹

By now, there is no standardized approach for optimal inflation pressure and pattern. Complete stent expansion is essential for achievement of adequate luminal gain and abolishment of neointimal hyperplasia. Indeed, by optimal pressure application, proper stent apposition will be achieved. Optimal inflation pressure and pattern could be defined as inflation with achievable optimal luminal gain without imposing the risk of edge dissection, stent thrombosis, and in-stent restenosis. Hereby, we describe staged inflation approach with very low risk of spontaneous coronary artery dissection. We currently use this approach for cases that undergo coronary intervention for de novo coronary lesions, regardless of lesion complexity or underlying

diseases as diabetes mellitus. In this procedure, the first inflation will be set on 6 atm. Then, balloon will be inflated about 1atm every 5 seconds. At each stage, balloon should be observed simultaneously on fluoroscope scene for expansion and manometer for pressure decrease and occurrence of minimal spontaneous deflation. Inflation rate will be continued until achievement of nominal pressure. In the case of spontaneous minimal deflation, inflation should be continued. If the final diameter is not achieved by reaching nominal pressure, it will be inflated until achievement of optimal luminal diameter (compared with proximal part of the lesion). In lesions with the long segment and or lesions with the great discrepancy between proximal and distal size, the required inflation rate seems to be higher than nominal pressure, especially for drug-eluting stent deployment.

In this study, all applied instruments will be FDA (Food and Drug Administration) approved ones. We did not follow cases for long-term outcomes. We just aimed to assess the occurrence of spontaneous coronary artery dissection as a cause of in-stent thrombosis following vascular intervention. End point of this investigation was occurrence of dissection. Occurrence of flow reducing and no-flow reducing spontaneous coronary artery dissection, haziness, low flow and no-reflow phenomenon were determined by final injection.

Coronary artery dissection is amongst complications related to the mechanical trauma to vessel wall during angioplasty, which might have a poor prognosis with great influence on patient survival. By staged inflation approach, immediate luminal gain is achieved with reduced rate of spontaneous coronary artery dissection (less than 0.01% in more than 1000 cases). Current reports on spontaneous coronary artery dissection following

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coronary intervention procedures note an incidence of 0.10-0.28%.³⁻⁵ The reduced rate of spontaneous coronary artery dissection with application of this procedure was seen for all lesions as small vessel lesions and bifurcation lesions. Staged inflation causes adjustment of muscles of medial compartment by increase in applied force due to balloon inflation. A sudden increase in diameter causes rupture in both intima and muscular layers. In this method, muscular layer becomes relaxed after application of minimal force. Indeed, the rate of local inflammation is decreased. Thus, better appointment of stent and intima would be achieved.

Staged inflation in interventional cardiology could be used for achievement of optimal luminal gain and reduced rate of spontaneous coronary artery dissection.

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Conflict of Interests

Authors have no conflict of interests.

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