

Relation Between Post Angioplasty Linear Filling Defects and Severity of Pain During Angioplasty

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There was a significant correlation between the severity of pain during angioplasty and linear filling defects at angioplasty site in post PTA angiograms. Most interventional radiologists recognized that the pain during angioplasty have no clinical consequences. Our study comprising of 55 angioplasties indicated that moderate to severe pain was associated with development of linear filling defects at the angioplasty site. As these cracks represents local wall dissections, a post angioplasty injection should never be made within the dilated segment, to avoid risk of propagating dissection.

Key Words: Arteries, transluminal angioplasty, angioplasty, complication, stenosis.

Often there is some degree of pain during balloon inflation for angioplasty. Moderate to severe pain may be an important warning of arterial wall dissection.² In these patients, it is common to see linear filling defects at the angioplasty site, representing portion of disrupted intima and media, outlined by contrast on both sides. These intimal and medial cracks are not permanent and usually have no clinical significance, as post angioplasty healing and remodelling regenerates a smooth intimal surface

(Fig 1).

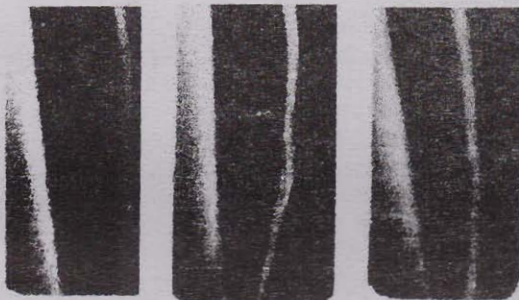


Figure 1: Remodeling of post-angioplasty cracks. A focal superficial femoral artery stenosis before A, and after B PTA. The angioplasty site is irregular, with the linear filling defects characteristic of intimal and medial cracking. C angiogram obtained 6 months later showed smooth dilated segment as a result of the remodelling process.

However, as these cracks represent a local wall dissection, post angioplasty injection should never be made within the dilated segment to avoid significant risk of propagating a dissection. For the same reason, recrossing a dilated segment with a guide wire should be avoided and if necessary should be done with extreme care. This study highlights the significance of pain during balloon inflation and emphasize that the possibility of

underlying arterial wall dissection with moderate to severe pain should not be overlooked.

Materials and Methods

A total of 55 angioplasties were performed in 48 patients with atherosclerosis, fibromuscular dysplasias and Takayasu's arteritis etc., between November 92 to February 95, at catheterization Lab, Mayo Hospital, Comprising of 10 axillary, 2 abdominal aortic, 5 iliac, 23 femoral and 15 popliteals angioplasties.

Technical failure such as subintimal passage of the guide wires or catheters were excluded in this study. Angioplasties were performed in routine fashion under local. The balloon size required was kept 20 % less selected by measuring the diameter of contralateral artery or the adjacent patent portion of the vessel on the conventional angiogram. An over size balloon was never used. The balloon was inflated by hand twice for 30S or several times until the "waist" of the balloon disappeared under fluoroscopy. Patients were asked to report any pain they experienced, and angiographers recorded the patient's distress and motion during balloon inflation. The data were scored from Zero to 3 by the following criteria: (0) no pain, (1) mild pain, no distress or motion, (2) moderate pain, face being distorted or moving slightly and (3) severe pain, giving a cry or major movement. The development of linear filling defects representing internal wall dissection in post PTA were correlated with severity of pain. Severe dissection after dilation was defined as an intimal dissection compromising flow.

Results:-

Out of 55 angioplasties, no pain was observed in 26 dilatations and non of them showed linear filling defects, there was mild pain in 14 dilatations out of which 5 cases showed linear filling defects, moderate pain was observed in 6 dilatations out of which 4 showed presence of cracks

and severe pain was observed in 9 dilatations, all of them showed evidence of intimal wall dissection.

The pain was observed mostly during balloon inflation. In few patients, however pain continued for several to 10 seconds after deflation of the balloon. There was no significant correlation between the severity of pain during angioplasty and degree of stenosis before angioplasty.

There was a greater incidence of moderate to severe pain (40-50%) in larger muscular arteries such as subclavian, iliac and abdominal aorta (Fig2)

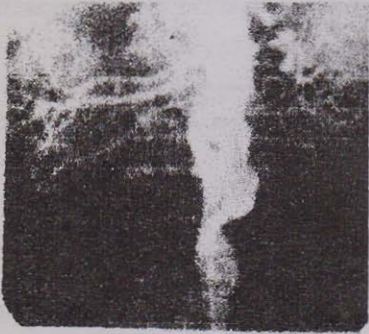


Figure2: Post angioplasty linear filling defect in abdominal aorta.

compared with lower incidence of 17% to 13% in smaller peripheral arteries such as femoral and popliteal. No over distension or arterial wall rupture occurred in our series.

Discussion:-

Electron microscopy shows presence of myelinated sensory nerve fibers in the adventitia of blood vessels¹, they register pain sensation caused by a penetrating object or a sudden distension of the vessel⁴. It has been suggested that pain during balloon inflation represents adventitial stretching³, upon intimal dissection and medial overdistension. In larger elastic arteries such as the aorta, subclavian and common iliac arteries, there are more sensory nerves than in the more peripheral muscular arteries^{3, 4, 5}. The significant difference in incidence of great severity of pain in larger arteries compared to small peripheral arteries may be explained by a different distribution of sensory nerves.

Some authors have described severe pain as an important warning of arterial rupture, although this is an extremely rare complication. Our study has also confirmed that severe pain may be a warning of severe dissection rather than arterial rupture. Severe intimal dissection not accompanied with clinical consequence is presumed to occur much more frequently than arterial rupture.

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