Phlebosclerosis of Great Saphenous Vein-Series of Cases During Coronary Artery Bypass Grafting (CABG)

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Abstract- Phlebosclerosis is defined as the fibrous degeneration of the venous wall, though in history, it has been defined from endophlebitis to hyalinzation of the intima of the venous wall, the actual pathology is obscure. We present a case series of three different cases from three different decades of life, 5th, 6th, 7th respectively with varied co-morbidities, in which we encountered phlebosclerosis, while harvesting GSV for coronary artery bypass grafting (CABG). To authors' knowledge, this is the first ever indigenous study on phlebosclerosis of GSV, the study would give an excerpt into the continuum on the natural history of the disease. The literature is reviewed and the case is presented.

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Introduction

CABG plays a major role in the treatment of complex multi-vessel coronary artery disease and diabetes mellitus (1). After the publication of STITCH trial in Sep. 2019 (2). CABG in particular with ischemic cardiomyopathy, will continue to remain as the versatile procedure for coronary revascularisation. Despite the use of LIMA & other radial grafts in CABG, Great Saphenous Vein (GSV) graft remains to be the fundamental conduit for CABG (3). They are the most readily available conduit and capable of providing immediate and reliable coronary flow with very low propensity of spasm (or) severe compromise during low cardiac output states (4).

Though the graft occlusion rate in GSV is found to be higher at a rate of 23% (5). The causative factor towards the same has not been studied in depth. One such, factor causing immediate occlusion, failure of use of the graft is venosclerosis (or) phlebosclerosis of the GSV; making a trivial situation in the OR, in terms of venturing for alternate conduit, waste of resources and the most valuable time factor. Hence, we present a series of three cases of CAD posted for CABG, over the period of one year from September 2019-2020, which had incidental finding of phlebosclerosis/venosclerosis.

Case Report

Case I

A 56-year-old female, presented to the emergency room of cardiology dept., with acute episode of breathlessness following chest pain from afternoon. She was immediately resuscitated and a provisional diagnosis of cardiogenic pulmonary edema was made. Patient was on intensive management in the cardiology Intensive Care Unit (ICU). Coronary angiogram was performed, which showed Left Main+Triple Vessel Disease LM+TVD disease LM-95%, LAD-90%, OM-80%, RCA-70% and was planned for emergency revascularisation by CABG. Patient was diabetic.

Patient was taken up for surgery, routine procedure of sternotomy, harvesting of LIMA was initiated and simultaneous harvesting of left leg GSV was done, and on cannulation with 16F IV cannula found it to be non-dilating and thickened. The cannula was manoeuvred to

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rule out dissection. But further no dilation was possible even with instillation of heparinized saline. Hence, harvesting of the left GSV was abandoned and right was started, which was normal and CABG was performed uneventfully. Post-operatively patient did well and was discharged on POD#5. Figure 1 shows pathological picture of cross section of vein showing sclerosis with infiltrates of mononuclear cells.

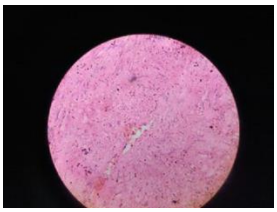

Figure 1. Microscopic examination of segments of vein show sclerosis with narrowed lumen along with mononuclear infiltration seen within the vessel wall

Case II

61-year-old female, with co-morbidities of Diabetes Mellitus (DM), Hypertension (HTN), was diagnosed to have CAD-TVD (Coronary artery disease-Triple vessel disease), NSTEMI (Non-ST elevation Myocardial Infarction) and was planned for CABG electively. Patient was prepared and taken up for surgery. Sternotomy & left GSV harvesting was done simultaneously and left GSV was thinned out and failed to dilate on cannulation. The left GSV was discarded and right GSV was harvested, which was normal and rest of the CABG was completed uneventfully.

The Left GSV which was sclerosed was sent for histopathological examination and the images are given below (Figure 2). In post-op follow up, did not have any signs of surgical site infection.

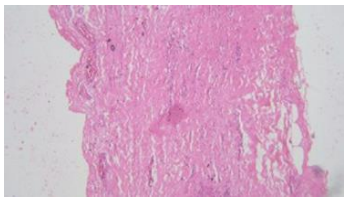

Figure 1. Case II showing cross-section of the vessel wall with diffuse sclerosis

Case III

71-year-old male, a case of CAD-TVD with multiple co-morbidities of DM, HTN and was planned for elective CABG. Patient was taken up for surgery, left GSV was dissected from the tissue bed and leg was opened up in full length. On cannulation and dilation with heparinised saline, there was a failure to dilate and the vein started to collapse with ultimate gross picture of venosclerosis, Right GSV was harvested immediately; which was also found to be thinned out and failed to dissect on cannulation. Figure 3 shows histopathological examination. Only a segment of right GSV which was normal was taken and remaining graft was taken from the right thigh-saphenous vein.

An excess time of 1 hour was added to the usual procedure time, due to the harvesting of multiple vein segments. Therein, CABG was completed uneventfully, follow up was uneventful in the post-operative, with no signs of surgical site infection or graft occlusion on follow up at 2-week, 1 month, and 3 months.

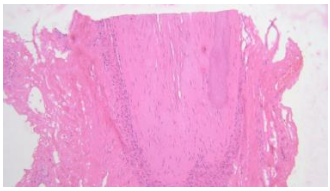

Figure 3. Case III showing thickened vessel wall lumen with infiltrates

Discussion

Earliest documented literature of phlebosclerosis was from 1905, by three studies by Meakins (1905), stahl & Zeh (1920), hauswirth/Eisenberg (1931), describing it as slow, gradual seen in patients between 18 & 45 years of age, associated with cases of gout, lead poisoning, andsyphilis (8). But none of three cases we reported, had similar findings as all 3patients were older than 55 yrs., and none had clinical features of gout, lead poisoning or syphilis. Another report by Boyd, indicatesas phlebosclerosis occurs in the age group between 20 to 30, which is also negated in our study, based on the presentation (9). Hauswirth, described the presence of phlebosclerosis in association with peptic ulcer disease, but present and past history of the three cases, did not yield any positive history.

First ever case of phlebosclerosis was published in 1953, in BMJ (British Medical Journal), which reported a 20-year-old male, with lumps in front of the elbows & knees, which was present in the venous system of both upper limbs & lower limbs (peripheral) & central nervous system of renal vein, along with calcification in the renal pedicle. In this case again, clinically easily detectable lumps were present; though there was no secondary cause of the calcification in any of the veins, like parathyroid dyscrasia, it was the first ever case of phlebosclerosis.

In 2013, Jodati *et al*., published a case report on Phlebosclerosis of the great saphenous vein of a 72-year-old male, affected with poliomyelitis, while harvesting GSV for CABG, phlebosclerosis was found in the normal leg as compared to the polio-affected leg was normal and GSV was harvested for the same for grafting. This study gives a key towards the pathophysiology, as in more strain on the leg may be a causative factor for the venosclerosis (9).

Phlebosclerosis is defined as fibrous degeneration of the venous wall, affecting predominantly the intima, with or without calcification. Though the morphological picture is similar to arteriosclerosis and localization various to a great extent (10).

Though this pathology received only sporadic attention in all of the literature. Its incidence over the great veins of IVC have been reported in 50% of the autopsy cases. This study published in 1992, states that aging and diabetes increase the incidence of phlebosclerosis, which correlates for the discussion in our study of three cases (9).

In our three cases, phlebosclerosis is found to occur in older age group above the 5th decade.

Based on our observation of the incidence of phlebosclerosis in our cases with CABG, though present at low incidence (3/899 over a period of one year~0.3%) needs to be in the cautious side of differential diagnosis, during the peri-operative period, on early identification and use of venous graft in the same patient should be warranted as the chances of graft occlusion is still present, and also the consensus on the need of pre-operative venous study for all cases of CABG, maybe the continuum of this case-series report.

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