Bahrain Medfical Bulletin, Vol. 24, No 4, December 2002

Direct Stenting for Multiple Saphenous Vein Grafts

Sundeep Misra, MD, DM; Balram Bhargava, MD, DM, F ACC; Nitish Naik, MD, DM;

Rajiv Narang, MD, DM, MRCP; Sandeep Seth, MD, DM;

Subhash C Manchanda, MD,DM

A 72-year-old nondiabetic male patient presented to us with two months history of NYHA Class III angina. He was operated for triple vessel disease 5 years back with four saphenous vein grafts being given to the left anterior descending (LAD), fourth obtuse marginal (OM4), right coronary artery (RCA) and a Y graft given to the first diagonal (Dl) and the second obtuse marginal (OM2) respectively. In view of discrete nature of lesions of OM2, OM4 and D1 direct stenting of the three saphenous vein grafts was successfully done on a single sitting.

Bahrain Med Bull 2002;24(4):

The treatment of patients with obstructive disease of coronary artery bypass grafts continues to pose a challenge, since repeated surgery entails substantial risk and the results of conventional angioplasty have been generally disappointing[1,2].The procedure is limited by a high restenosis rate (especially in the ostium and shaft portions of the vein graft) and substantial periprocedural complications, particularly in older vein grafts with unfavourable morphologic features[2-6]. Stenting is associated with superior initial

Department of Cardiology, Cardiothoracic Sciences Centre, All India Institute of Medical Sciences, New Delhi -110029, INDIA

angiographic results, higher rates of procedural success, and fewer periprocedural nonQ myocardial infarctions and a better clinical outcome at 6 months[7] . However, in most studies the number of grafts treated has been limited to one procedure at a time. We have reported good procedural and intermediate term results with multiple, saphenous vein graft (SVG) stenting in carefully selected patients[8]. Recently direct stenting has emerged as an attractive alternative to a strategy of balloon dilatation followed by stent implantation in selected patients, because of lesser procedure time and lower cost involved[9]. Herein, we report a patient where direct stenting was performed in all three stenotic saphenous vein grafts in one sitting with good result.

CASE REPORT

A 72-year-old nondiabetic male patient presented to us with two months history of NYHA Class III angina. He was operated for triple vessel disease 5 years back with four saphenous vein grafts being given to the left anterior descending (LAD), fourth obtuse marginal (OM4), right coronary artery (RCA) and a Y graft given to the first diagonal (Dl) and the second obtuse marginal (OM2) respectively. Coronary angiography performed revealed that gaft to LAD was well patent but the grafts to OM2, OM4 and DI were significantly diseased and RCA graft was blocked. In view of discrete nature of lesions of OM2, OM4 and Dl direct stenting was planned.

Graft to OM4 was hooked with 8FR 3.5 guiding catheter (Cordis Europe NV, Roden, The Netherlands), lesion was crossed with 0.14inch GT -1 support guidewire (Medtronic,

Minneapolis, MN) and direct stenting using 3 x 15 mm Medtronic™ AVE- 670 stent (Medtronic, Minneapolis, MN) was done, deployed at 10 atmospheres for 40 seconds. The OM2, and Dl lesions, which were in a Y SVG graft, also underwent direct stenting, both lesions having been crossed with same guidewire, one after the other. First the OM2 lesion was directly stented with a 3 x 18 mm Velocity™ stent (Cordis Europe NV, Roden, The Netherlands) deployed at 12 atmospheres for 20 seconds and then Dl lesion also underwent direct stent implantation with 2. 75 x 23 Tristar™ stent (Guidant Advanced Cardiovascular System, Temecula, CA) deployed at 10 atmospheres for 30 seconds. The patient did not complain of any chest pain during the procedure and the electrocardiogram did not reveal any significant changes during the procedure.

Check angiogram revealed good patency in all the three lesions with residual stenosis of less than 5%. Aspirin 325 mg OD and Ticlopidine 250mg BID was started 72 hours before the procedure and continued till one month after the procedure, after which ticlopidine was discontinued. The patient is continuing on 150mg enteric-coated aspirin OD life long. Three months post stenting the patient is in class I and has had no clinical events.

FIGURE LEGENDS: Figure 1.

(A) Pre (left panel) and post (right panel) direct stenting of mid SVG to OM4.

(B) Pre (left panel) and post (right panel) direct stenting of mid SVG to OM2 and mid disease in SVG to Dl (Y graft) with excellent angiographic results at all three treatment sites.

All three SVG lesions were in the same patient and treated by direct stenting in the same intervention session.

DISCUSSION

Coronary stenting in SVGs is technically demanding because of degenerated nature of grafts and the risk of distal embolization [10]. New techniques to reduce distal embolization are, use of covered stents to segregate fibrous plaque, a host of distal protection devices and possibly direct stenting. Covered stents are still investigational and are associated with a delayed endothelialization and thrombosis, potentially worrisome during treatment of long lesions[11,12]. The use of different distal protection devices and aspiration systems are being investigated during SVG interventions and have shown promising results[13,14] . The use of differing stent designs and high pressure balloons have also shown benefit[15]. Direct stenting has not been extensively studied in SVG intervention and may potentially be useful[16,17]. Besides decreasing the risk of distal embolization direct stenting may have numerous other advantages. These include shorter procedure time, lower contrast dose and reduced spiral dissections. Furthermore, there is a potential financial benefit of less balloon and/or stent usage. However, concerns exist regarding failure of stent deployment and local complications. Recent studies have demonstrated that case selection is very important and in appropriately selected cases, it has a low rate of procedural failure and results in less contrast usage and fewer distal complications than conventional angioplasty and stenting[16-21].

The concomitant use of Gp IIb/IIIa inhibitors showed benefit in earlier studies, but recent studies failed to show benefit with the use of these agents in SVG intervention[22,23] .

Conclusion

Herein, we describe a case of multiple SVG graft disease where direct stenting was done in three lesions; we did not use any Gp IIb/IIIa inhibitor in this case with a good result. The intervention of three SVGs with direct stenting has not been described earlier. The FDA has not approved direct stenting, from their point of view, stenting is a treatment following predilatation. Physicians performing direct stenting are considered as not respecting the written label of the industry and the FDA. The results of randomized trials like the VEL VET and the DIRECTOR are awaited before this treatment becomes uniformly accepted.

REFERENCES

1. Cameron A, Kemp HG Jr, Green GE. Reoperation for coronary artery disease: 18 years of clinical follow-up. *Circulation* 1988; 78: Suppl.I : 1-158, 1-162.

2. deFeyter PJ, vanSuylen RJ, deJaegere PDT, Topol EJ, Serruys PW. Balloon angioplasty for treatment of lesions in saphenous vein bypass grafts. *J Am CoII Cardiol* 1993*;* 21: 1539-1549.

3. Webb JG, Myler RK, Shaw RE et al. Coronary angioplasty after coronary bypass surgery: initial resul1s and late outcome in 422 patients. *J Am CoII Cardiol* 1990*;* 16: 821-20.

4. Meester BJ, Samson M, Suryapranata H, et al. Long-term follow up after attempted angioplasty of saphenous with vein grafts: The Thoraxcenter Experience 1981-1988. *Eur Heart J* 1991; 12: 648-653.

5. Hirshfeld JW, Schwartz JS, Jugo R et al. Restenosis after coronary angioplasty: A multivariate statistical model to relate lesion and procedural variables to restenosis. *J Am Coll Cardiol* 1991*;* 18: 647-56.

6. Aueron F, Gruntzig A. Distal embolization of a coronary artery bypass graft atheroma during percutaneous transluminal coronary angioplasty .*Am J Cardiol* 1984; 53: 953-4.

7. Savage MP, Douglas Jr JS, Fischman DL, Pepine CL, King SB, Werner JA, et al. Stent placement compared with balloon angioplasty for obstructed coronary bypass grafts. *N Engl J Med* 1997; 337: 740-7.

8. Bhargava B, Kornowski R, Mehran R, Kent KM, Hong MK, Lansky AJ et al. Procedural results and intermediate clinical outcomes after multiple saphenous vein graft stenting.*J Am CoII Cardiol 2000;* 35: 389-397.

9. Armeston JA, Webster MW, Ruygrok PN, Elliot JM, Semmonds MB, Meredith IT et al. A randomized study of direct coronary stent delivery compared with stenting after predilatation: the NIR future trial on behalf of the NIR Future Trial Investigators. *Cathether Cardiovasc Inter* 2000; 50: 377-81.

10. Wong SC, Barm DS, Schatz RA, Terstein PS, King SB, Curry RC et al. Immediate results and late outcomes after stent implantation in saphenous vein graft lesions. The multicenter US Palmaz-Schatz stert experience. *J Am CoII Cardiol* 1995*;* 26: 704-712.

11. Baldur S, Koster R, Reimers J, Hamm CW. Membrane covered stents for the treatment of aortocoronary vein graft disease. *Catheter Cardiovasc Interv* 2000; 50(1): 83-8.

12. Gurbel PA, Criado FJ, Curnutte EA, Patten P, SecadaLovio J. Percutaneous revascularization of an extensively diffused saphenous vein bypass graft with a saphenous vein covered Palmaz Stent. *Cathet Cardiovasc Diagn* 1997; 40: 75-8.

13. Carlino M, De Gregorio J, Di Mario C, Anzuini A, Airoldi F, Albieo R, Briguori C, Dharmadhikari A, Sheiban I, Colombo A. Prevention of distal embolization during saphenous vein graft lesion angioplasty .Experience with a new temporary occlusion and aspiration system. *Circulation* 1999;99(25):3221-3.

14. Stein BC, Moses J, Teirstein PS.Bal1oon occlusion and transluminal aspiration of saphenous vein grafts to prevent distal embolization. *Catheter Cardiovasc Interv* 2000 ;51(1):69-73.

15. Choussat R, Black AJ, Bossi I, Joseph T, Fajadet J, Marco J. Longterm clinical outcome after endoluminal reconstruction of diffusely degenerated saphenous vein grafts with less-shortening wallstents. *J Am CoIl Cardiol.* 2000;36(2):387 -94.

16. Chan A W, Carere RG, Solankhi A, Dodek A, Webb JG. Coronary stenting without predilatation in a broad spectrum of clinical and angiographic situations. *J Invasive Cardiol.*2000*;* 12: 75-9.

17. Heldman A W, Brinker JA. Direct stenting is the future near. Catheter Cardiovasc Interven 2000; 50: 382-3.

18. Veselka J, Mates M, Tesar DB, Aschermann M, Urbanova T, Honek T. Direct stenting without predilatation: A new approach to coronary intervention. *Coron Artery Dis* 2000; 11: 503- 7.

19. De La Torre Hernandez J, Gomez Gonzabz I, Rodriguez Entem F, Royuela N, Antol, Zulco J et al. Intravascular ultrasonographic evaluation of direct stents implanted without

predilatation. Comparison of results according to stent types. *Rev Esr Cardiol* 2000*;* 53: 1335-41.

20. Taylor AJ, Broughton A, Federman J, Watten A, Keighley C, Haikerwal D et al. Efficacy and safety of direct stenting in coronary angioplasty .*J Invasive Cardiol* 2000; 12: 560-565.

21. Wilson SH, Berger PE, Mathew V, Bell MR, Garratt KN, Rihal CS, Bresnahan JF, Grill DE, Melby S, Holmes DR Jr. Immediate and late outcomes after direct stent implantation without balloon predi1ation. *J Am CoII CardioI* 2000*;35(4):937-* 43.

22. Mak KH, Challapalli R, Eisenberg MJ*,* Anderson KM, Califf RM, Topol EJ.. Effect of platelet glycoprotein IIb/IIIa receptor inhibition on distal embolization during percutaneous revascularization of aortocoronary saphenous vein grafts. EPIC Investigators. Evaluation of IIb/IIIa platelet receptor antagonist 7E3 in Preventing Ischemic Complications. *Am J Cardiol.* 1997;80(8):985-8.

23. Mathew V, Grill DE, Scott CG, Grantham *JA,* Ting HH, Garratt KN, Holmes DR jr. The influence of abciximab use on clinical outcome after aortocoronary vein graft interventions. *J Am CoII Cardiol.* 1999;34(4):1163-9.

Address for Correspondence:

BALRAM BHARGAVA, MD, DM, FACC Consultant Cardiologist,
Salmaniya Medical Centre, Ministry of Health,
STATE OF BAHRAIN, Fax: 973-275232
E-mail: balrambhargava @Yahoo.com