Bilateral Carotid Stenting Prior to Coronary Artery Bypass Graft : A Case Report

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Abstract

Background : Carotid stenosis is an independent possible complication of the central nervous system of patients after receiving a coronary artery bypass graft (CABG). The risk increases when the patient has bilateral carotid stenosis even if asymptomatic.

Case report : A 76 year-old female was admitted because of unstable angina. The coronary angiography showed triple vessel disease and required CABG for revascularization. Her physical examination revealed bilateral carotid bruits. She did not have any history of neurological deficit. Carotid Doppler showed critical stenosis of bilateral carotid arteries. The carotid angiography demonstrated 70 per cent diameter stenosis of both internal carotid arteries just above the bifurcation of the external carotid artery. A 7 x 20 mm self-expandable Smart® stent was implanted first in the right carotid artery with good angiographic result. Five days later, another 7 x 20 mm self-expandable Smart® stent was implanted in the left carotid artery without residual stenosis. The patient did not have any cardiovascular complications. CABG was performed 2 weeks later with a good result. The patient was discharged 10 days after CABG.

Conclusion : Bilateral carotid stenting is feasible and produces an acceptable outcome. This procedure is an alternative treatment for preventing stroke during CABG surgery.

Key word : Coronary Artery Disease, Coronary Artery Bypass Graft, Carotid Stenosis, Carotid Stent

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Coronary artery bypass graft (CABG) is currently a common procedure performed worldwide including Thailand, and peri-operative stroke is a serious complication that causes high in-hospital mortality and prolonged hospitalization. The incidence of central nervous system (CNS) complication varies from 0.4 - 13.8 per cent[1-4]. When the complication develops, the in-hospital mortality rises to 21 per cent[5]. Carotid artery disease is well known in increasing the risk of the complication particularly in patients who had bilateral carotid stenosis [6,7]. Simultaneously, combined carotid endarterectomy (CEA) and CABG can be performed with an acceptable outcome and it may improve or prevent a cerebrovascular accident, a common complication during the pump time[8-11]. However, recent reports [12-14] have shown that elective carotid stenting prior to CABG or severe coronary disease requiring elective coronary angioplasty can performed with acceptable results.

CASE REPORT

A 76 year-old female was admitted to King Chulalongkorn Memorial Hospital because of high-risk unstable angina pectoris. Coronary angiography revealed severe triple vessel disease and required CABG for revascularization. Physical examination demonstrated bilateral carotid bruits. The patient did not have any history of neurological deficit. Carotid Doppler showed critical stenosis of bilateral carotid arteries. Carotid angiography demonstrated 70 per cent stenosis of both internal carotid arteries just above the bifurcation of the external carotid artery (Fig. 1 and 2). A 7 x 20 mm Smart® self-expandable stent was first implanted in the right carotid artery with a good angiographic result. Five days later, another 7 x 20 mm Smart® self-expandable stent was implanted in the left carotid artery without residual stenosis. The procedure time was 63 and 39 minutes, the fluoroscopy time was 13 and 8 minutes, respectively. The patient did not have any cardiovascular complications. She received a standard regimen of aspirin combined with clopidogrel after the stenting procedure. CABG was performed 2 weeks later with an uneventful result. She was discharged 10 days after CABG.

DISCUSSION

This is the first case of bilateral carotid stenting in our center prior to CABG surgery. The incidence of stroke after carotid stenting varies from 7-10 per cent[12,15,16]. However, most of the cases were minor stroke or transient neurological deficits. Major stroke occurs in 1-2 per cent[12,15,16] and is equivalent to the CEA procedure[17-20]. Recently, the distal protection device was introduced and could prevent distal embolization. Hence, the incidence of stroke declined to 1 - 3 per cent[21-25]. However, this device is currently not available in Thailand.

Carotid stenting in asymptomatic carotid stenosis is currently controversial. Nevertheless, when the patient has to undergo CABG surgery, she/he is also at a high-risk of developing a CNS complication. The risk is increased when the patient has bilateral carotid stenosis. Carotid revascularization either through stenting or CEA may reduce the CNS

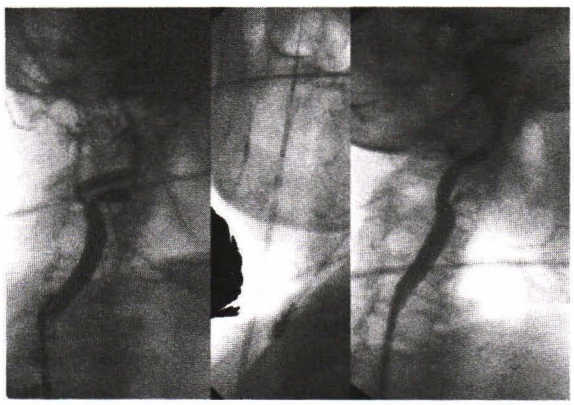

Fig. 1. Right carotid artery, pre-stenting and post stenting.

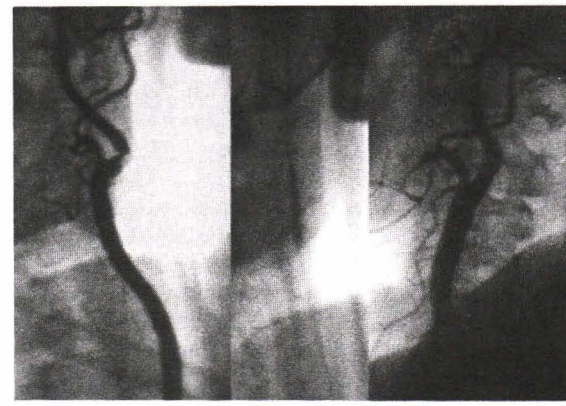

Fig. 2. Left carotid artery, pre-stenting and post stenting.

complications and may prevent a future stroke. The incidence of stent restenosis or repeated angioplasty or CEA is about 4 per cent at 6-month follow-up[15] and then the progress rate of atherosclerosis is as stable as a normal artery.

SUMMARY

Bilateral carotid stenting is feasible and produces acceptable outcomes with minimal complications. This procedure is an alternative treatment for preventing stroke during CABG surgery.

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REFERENCES

1. Mora CT, Murkin JM. The central nervous system: Responses to cardiopulmonary bypass. In: Mora CT, ed. Cardiopulmonary bypass: Principles and techniques of extracorporeal circulation. New York: Springer-Verlag, 1995: 114-46.
2. Shaw PJ, Bates D, Cartlidge NEF, Heaviside D, Julian DG, Shaw DA. Early neurological complications of coronary artery bypass surgery. BMJ 1985; 291: 1384-7.
3. Sotamiemi KA. Cerebral outcome after extracorporeal circulation: Comparison between prospective and retrospective evaluations. Arch Neurol 1983; 40: 75-7.
4. Roach GW, Kanchuger M, Mangano CM, et al. for the Multicenter Study of Peri-operative Ischemia Research Group and the Ischemia Reseach and Education Foundation Investigators. Adverse cerebral outcomes after coronary bypass surgery. New Engl J Med 1996; 335: 1857-63.
5. Bilfinger TV, Reda H, Giron F, Seifert FC, Ricotta JJ. Coronary and carotid operations under prospective standardized conditions: Incidence and outcome. Ann Thorac Surg 2000; 69: 1792-8.
6. Schwartz LB, Bridgman AH, Kieffer RW, et al. Asymptomatic carotid artery and stroke in patients undergoing cardiopulmonary bypass. J Vasc Surg 1995; 21: 146-53.
7. Peric M, Huskic R, Nezic D, et al. Combine carotid and coronary artery surgery: what have we learned after 15 years? Cardiovasc Surg 1998; 6: 156-65.
8. Snider F, Rossi M, Manni R, et al. Combine surgery for cardiac and carotid disease: Management and results of a rational approach. Eur J Vasc Endovasc Surg 2000; 20: 523-7.
9. Birincioglu CL, Bayazit M, Ulus AT, Bardakci H, Kucuker SA, Tasdemir O. Carotid disease is a risk factor for stroke in coronary bypass operations. J Card Surg 1999; 14; 417-23.
10. Gangemi JJ, Kron IL, Ross SD, Tribble CG, Kern JA. The safety of combined cardiac and vascular operations: How much is too much? Cardiovasc Surg 2000; 8: 452-6.
11. Kaul TK, Fields BL, Riggins LS, Wyatt DA, Jones CR. Coexistent coronary and cerebrovascular disease: Results of simultaneous surgical management in specific patients groups. Cardiovasc Surg 2000; 8: 355-65.
12. Waigand J, Gross CM, Uhlich F, et al. Elective stenting of carotid artery stenosis in patients with severe coronary artery disease. Eur Heart J 1998; 19: 1365-70.
13. Babatasi G, Massetti M, Theron J, Khayat A. Asymptomatic carotid stenosis in patients undergoing major cardiac surgery: Can percutaneous carotid angioplasty be an alternative? Eur J Cardiothorac Surg 1997; 11: 547-53.
14. Kihara S, Shimakura T, Tanaka SA, et al. Staged coronary artery bypass grafting after percutaneous angioplasty for intracranial vascular stenosis. J Thorac Cardiovasc Surg 2001; 122: 608-10.
15. Roubin GS, New G, Iyer SS, et al. Immediate and late clinical outcomes of carotid artery stenting in patients with symptomatic and asymptomatic carotid artery stenosis; A 5-year prospective analysis. Circulation 2001; 103: 532-7.
16. Wholey MH, Wholey M, Mathias K, et al. Global experience in cervical carotid artery stent placement. Cathet Cardiovasc Interv 2000; 50: 160-7.
17. Randomised trial of endarterectomy for recently symptomatic carotid stenosis: Final results of lthe MRC European Carotid Surgery Trial (ECST). Lancet 1998; 351: 1379-87.
18. Executive Committee for the Asymptomatic Carotid Atherosclerosis Study. Endarterectomy for asymptomatic carotid artery stenosis. JAMA 1995; 273: 1421-8.
19. Barnett HJ, Taylor DW, Eliasziw M, et al. Benefit of carotid endarterectomy in patients with symptomatic moderate or severe stenosis: North American Symptomatic Carotid Endarterectomy Trial Collaborators. N Engl J Med 1998; 339: 1415-25.
20. Hobson RW II, Brott T, Ferguson R, et al. CREST: Carotid Revascularization Endarterectomy *versus* Stent Trial. Cardiovasc Surg 1997; 5: 457-8.

21. Reimers B, Corvaja N, Moshiri S, et al. Cerebral protection with filter devices during carotid artery stenting. Circulation 2001; 104: 12-5.
22. Theron JG, Payelle GG, Coskum O, et al. Carotid artery stenosis: Treatment with protected balloon angioplasty and stent placement. Radiology 1996; 201: 627-36.
23. Henry M, Amor M, Henry I, et al. Carotid stenting with cerebral protection: First clinical experience using the PercuSurge GuardWire system. J Endovasc Surg 1996; 6: 321-31.
24. Albuquerque FC, Teitelbaum GP, Lavine SD, et al. Balloon-protected carotid angioplasty. Neurosurgery 2000; 46: 918-21.
25. Ohki T, Roubin GS, Veith FJ, et al. Efficacy of a filter device in the prevention of embolic events during carotid angioplasty and stenting: An ex vivo analysis. J Vasc Surg 1999; 30: 1034-44.

การใส่ขดลวดทั้ง 2 ข้างของหลอดเลือดแดงแคโรติค ก่อนการทำผ่าตัดต่อเส้นเลือดหัวใจ: รายงานผู้ป่วย 1 ราย

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ภูมิหลัง : เส้นเลือด carotid ที่ตีบเป็นปัจจัยเสี่ยงที่สำคัญอย่างหนึ่งของการเกิดภาวะแทรกซ้อนทางสมองภายหลังจากการทำผ่าตัดต่อเส้นเลือดหัวใจและจะมีผลมากขึ้นในผู้ป่วยที่เส้นเลือดทั้งสองข้างของ carotid ตีบแคบถึงแม้ว่าผู้ป่วยจะไม่เคยมีอาการทางสมองมาก่อน

กรณีศึกษา : ผู้ป่วยหญิงไทยอายุ 76 ปี มาโรงพยาบาลด้วยเรื่องอาการเจ็บแน่นหน้าอกและได้รับการวินิจฉัยว่าเป็น unstable angina ผลการฉีดสีดูเส้นเลือดหัวใจพบว่า เส้นเลือดหัวใจทั้งสามเส้นตีบและจำเป็นได้ต้องได้รับการผ่าตัดต่อเส้นเลือดหัวใจ จากการตรวจร่างกายพบเส้นฟู่ที่บริเวณคอทั้งสองข้าง (bilateral carotid bruit) จาก Doppler ultrasound พบว่ามีการตีบอย่างชัดเจนของเส้นเลือด carotid ทั้งสองข้าง การฉีดสีดูเส้นเลือดที่คอพบว่ามีการตีบแคบประมาณ 70% ของ internal carotid ที่บริเวณเหนือต่อ bifurcation ทั้งสองข้าง ผู้ป่วยได้รับการใส่ stent ที่ right internal carotid artery ด้วย 7 x 20 mm self-expandable Smart stent ห้าวันต่อมาได้ทำการใส่ stent ที่ left internal carotid artery ด้วย 7 x 20 mm self-expandable Smart stent ไม่พบภาวะแทรกซ้อนเกิดขึ้นภายหลังจากการใส่ stent 2 สัปดาห์ต่อมา ผู้ป่วยได้รับการรักษาด้วยการทำผ่าตัดต่อเส้นเลือดหัวใจและสามารถกลับบ้านได้ภายใน 10 วันโดยไม่พบภาวะแทรกซ้อน

บทสรุป : การใส่ stent ในเส้นเลือด carotid ทั้งสองข้างสามารถทำได้ด้วยความปลอดภัยและภาวะแทรกซ้อนต่ำหัตถการนี้เป็นอีกทางเลือกหนึ่งของการป้องกันการเกิดภาวะแทรกซ้อนทางสมองภายหลังจากการผ่าตัดต่อเส้นเลือดหัวใจ

คำสำคัญ : เส้นเลือดหัวใจตีบ, การทำผ่าตัดต่อเส้นเลือดหัวใจ, เส้นเลือดแคโรติคตีบ, การใส่ขดลวดที่เส้นเลือดแคโรติค

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