Case Report

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Unprotected Left Main Percutaneous Coronary Intervention in a 108-Year-Old Patient

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With the increase in life expectancy, the proportion of very elderly people is increasing. Coronary artery disease (CAD) is an important cause of mortality and morbidity in this age group, for which myocardial revascularization is often indicated. Percutaneous coronary intervention (PCI) in the very elderly bears the inherent risks of complications and mortality, but the potential benefits may outweigh these risks. A number of observational studies, registries, and few randomized controlled trials have shown the safety and feasibility of PCI in octogenarians and nonagenarians. However, PCI is only rarely done in centenarians; so, the outcome of percutaneous coronary revascularization in this age group is largely unknown. PCI in a centenarian with complex CAD is described here; the patient presented with unstable angina despite optimum medical therapy, and surgery was declined. Good angiographic success was followed by non-cardiac complications, which were managed with a multidisciplinary approach. **(Korean Circ J 2014;44(2):113-117)**

KEY WORDS: Angina, unstable; Percutaneous coronary intervention; Elderly.

Introduction

With the increase in life expectancy, the proportion of the elderly population is constantly growing. In the UK, between 2002 and 2011, there was a 26% increase in the number of people aged ≥90 years; the number of nonagenarians was estimated to be 440290 (just under 1% of the total population), and the number of centenarians was 11700 in 2011.[1] By the year 2015, there will be more than 2.4 million nonagenarians and 0.1 million centenarians in the U.S.[2] Cardiovascular disease is one of the leading causes of morbidity and mortality among the elderly. Though not advocated by the standard practice guidelines, these very elderly patients are often treated half-heartedly, and an invasive strategy is often avoided in them. Patients aged ≥85 years represent nearly 12% of all acute coronary syndrome (ACS) admissions to UK hospitals, but this age group is the least likely to receive revascularization, with only 10% of patients undergoing a diagnostic coronary angiogram (CAG).[3] Here, percutaneous coronary intervention (PCI) was performed in a symptomatic centenarian patient with complex coronary artery disease (CAD), with good angiographic success. Post procedural complications were managed with a multidisciplinary approach.

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Case

A 108-year-old man was referred with ongoing chest pain on minimal or no exertion (Canadian Cardiovascular Society class III-IV) despite optimum medical therapy. He was an ex-smoker, hypertensive, but non-diabetic, and had chronic kidney disease, Parkinsonism and below-knee amputation of the left leg due to a previous road-traffic accident. His pulse was 80/min, blood pressure 140/90 mm Hg, and the lung bases were clear. His resting electrocardiogram (ECG) showed sinus rhythm, ST depression and T inversion in leads V 5, V 6, I and aVL, and ST elevation in aVR (Fig. 1A); echocardiography revealed distal septal and basal inferior left ventricular wall hypokinesia with a left ventricular ejection fraction of 45-50%. Blood counts and biochemistry including the sugar and lipid profile were normal. Serum creatinine was 1.6 mg/dL, and the glomerular filtration rate was 40.8 mL/min. CAG was done because of ongoing chest

pain; there was triple vessel disease with involvement of the left main coronary artery (LMCA); there was 75% stenosis in the distal LMCA, 95% stenosis in the proximal segment and 75% stenosis in the mid segments of the left anterior descending (LAD) artery, 75% osteo-proximal and 90% distal stenosis in the left circumflex (LCX) artery, and total occlusion of the right coronary artery from the origin (Fig. 2). The calculated Euroscore was 20, and the SYNTAX score 37. Coronary artery bypass graft (CABG) surgery was advised, but the surgeons declined to perform it. So, percutaneous transluminal coronary angioplasty and stenting were done for the LMCA and LAD lesions; LMCA was hooked by a JL 3.5, 7 Fr guide catheter, and the LAD lesion was navigated with a hydrophilic guidewire (BMW guidewire, Abbott Vascular, Santa Clara, CA, USA), while another hydrophilic guidewire (Runthrough™ NS Coronary Guidewire, Terumo Medical Corporation, Tokyo, Japan) was kept in the distal LCX. Predilatation was done with a 2.5×12 mm noncompliant balloon (NC Sprinter RX Noncompliant Balloon Dilatation Catheter, Medtronic Vascular, Minneapolis, MN, USA) at 12-14 atm. A 2.75×36 mm biodegradable polymer drug-eluting stent (DES) (BioMatrix Flex, Biosensors International, Bulach, Switzerland) was deployed over the proximal to mid LAD lesion at 14 atm for 20 seconds. Another 3.5×33 mm BioMatrix Flex stent (Biosensors International) was deployed over the left main to proximal LAD lesion at 14 atm for 20 seconds, and overlapped with the previous stent. Post-dilatation was done with a 3.5×12 mm Quantum balloon (Quantum™ Maverick® Balloon Catheters, Boston Scientific Corp.) that was deployed at up to 22 atm. The LCX wire was re-crossed, and the ostial lesion was dilated with a 2.5×12 mm noncompliant balloon (NC Sprinter RX Noncompliant Balloon Dilatation Catheter, Medtronic Vascular) at 12 atm. Finally, kissing balloon dilatation was done with LAD (3.5×12 mm Quantum) and LCX (2.5×12 mm Sprinter) balloons at 18 and 12 atm respectively. Thrombolysis in Myocardial Infarction III flow was established (Fig. 3). A temporary pacemaker and intra-aortic balloon pump, and provisions for an emergency CABG were kept ready. The immediate post-procedural period was uneventful. The patient was free of chest pain; ECG changes became normal (Fig. 1B),

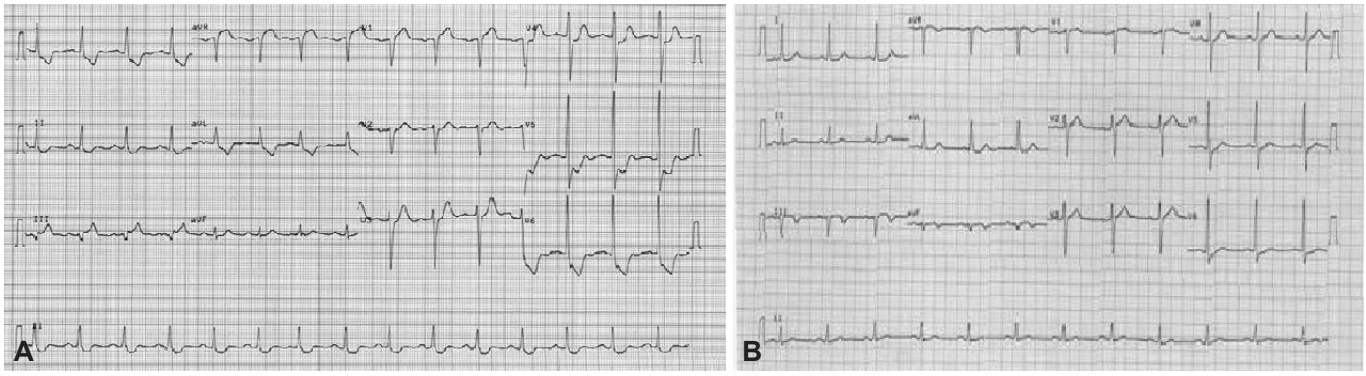

Fig. 1. Pre and post-procedure resting 12-lead ECG. A: admission ECG showing ST depression and T inversion in leads V 5, V 6, I and aVL, and ST elevation in aVR. B: ECG after the procedure showing near normalization of previous findings. ECG: electrocardiogram.

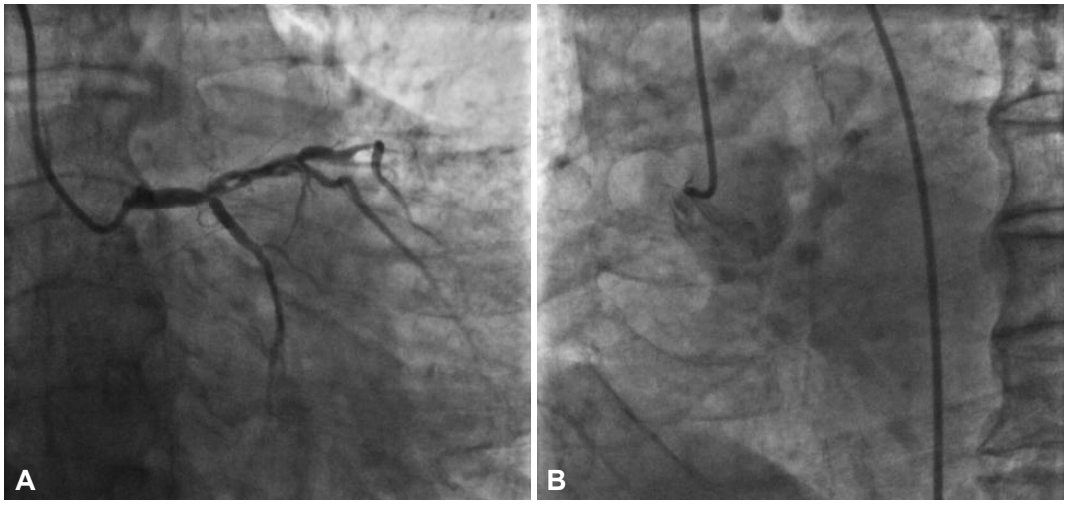

Fig. 2. Coronary angiogram before PCI. A: 75% stenosis in distal LMCA, 95% stenosis in proximal LMCA and 75% stenosis in mid segments of the left anterior descending artery, 75% osteo-proximal and 90% distal stenosis in left circumflex artery. B: total occlusion of right coronary artery from the origin. PCI: percutaneous coronary intervention, LMCA: left main coronary artery.

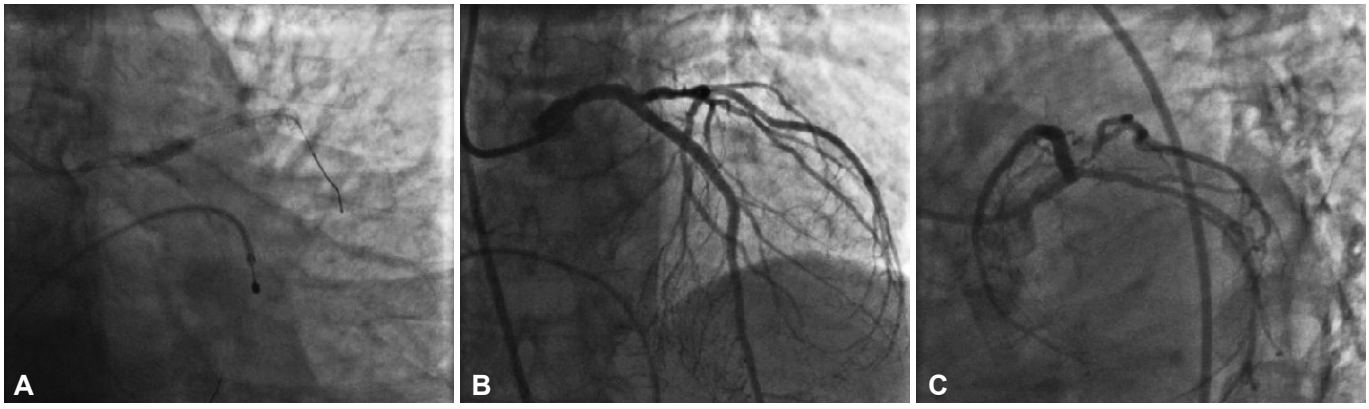

Fig. 3. Percutaneous coronary intervention in the unprotected left main coronary artery. A: kissing balloon inflation. B and C: Thrombolysis in Myocardial Infarction III flow without any residual stenosis.

echocardiography revealed improvement in regional left ventricular wall motion, with an ejection fraction of 58%, and the troponin I was negative (0.118 ng/mL). However, on the first post-procedural day, the patient developed an acute confusional state and abdominal distension. A CT scan of the brain and an ultrasonogram of the abdomen revealed no significant abnormalities. Blood biochemistry including the serum creatinine was normal. On day 2, the confusional state and abdominal distension improved with conservative measures, and on the third post-procedure day, the patient was oriented and able to converse well. He was discharged with aspirin 75 mg and clopidogrel 75 mg daily. During the subsequent 3 months' follow-up, the patient remained free of symptoms.

Discussion

In contemporary practice, almost 25% of all PCIs are performed in patients aged ≥75 years and 12% are performed in those aged ≥80 years.[4)5)] The elderly have more cardiovascular risk factors and a greater ischemic burden than younger patients needing PCI, and therefore, derive greater benefit from revascularization; however, they are also more likely to experience procedural complications owing to age-related physiological changes, frailty, and comorbidities.[6)]

Early studies and their meta-analyses demonstrated higher mortality and morbidity in elderly patients undergoing PCI in comparison to younger patients, but the scenario has improved subsequently.[4)5)7)] This reduction in mortality has been attributed to a combination of improved patient selection, evolution of revascularization techniques, and evidence-based use of periprocedural medications that better balance the risks of thrombosis and bleeding.[4)] A recently published single-centre, retrospective, cohort study involving patients aged ≥85 years undergoing PCI showed in-hospital, 30-day and 1-year mortality rates of 2.4%, 4.4%, and 17.7%, respectively; 30-day (5.6% vs. 3.4%, p=0.24) and 1-year (20.0% vs. 14.0%, p=0.19) mortality rates were similar between the ACS and elective patients, respectively. Age, male sex, previous PCI and the presence of shock were the independent predictors of 1-year mortality.[8)] PCI is clearly effective in old age but a careful and holistic approach to patient selection is essential to get the best outcomes.[9)]

The choice between PCI and CABG for myocardial revascularization in the elderly depends on the complexity of the coronary lesions, and the presence of comorbidity. PCI is less invasive than CABG. It is generally accepted that patients with single-vessel obstructive CAD are best treated with PCI; however, the optimum revascularization strategy in patients with multivessel CAD with a higher ischemia burden, greater risk of recurrent ischemic events, and higher mortality is a matter of ongoing debate.[10)] In a cohort of 10141 patients with multivessel CAD aged >85 years, PCI showed early benefits of lesser morbidity and mortality, but CABG outcomes were significantly better by 3 years (p<0.01).[11)] In meta-analyses of trials comparing PCI and CABG for coronary revascularization, CABG was found to have either similar[7)] or better[12)] mortality outcomes in elderly patients. Other recent meta-analyses of studies comparing PCI and CABG in patients with a mean age of ≥70 years and unprotected LMCA disease revealed no significant differences between PCI and CABG for all cause-mortality, nonfatal MI, and major adverse cardiac and cerebrovascular events (MACCE) at 30 days and 12 and 22 months; however, PCI was associated with shorter hospital stay and lower rates of early stroke but higher repeat revascularization rates on the longer term follow-up.[13)] However, in comparison to PCI, CABG surgery was associated with a higher risk of neurological complications, perioperative MI, renal failure, prolonged ventilation and nosocomial infections.[14)] So, despite the slight advantage of surgical over percutaneous revascularization in elderly patients with multivessel CAD, surgical revascularization should remain an option only for selected highly functioning elderly patients with few comorbidities.[6)] The patient presented here was already frail, had Parkinsonism, some cognitive impairment and amputation of a limb, so surgery would have been less suitable for him despite the presence of com-

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plex coronary lesions. Another issue is LMCA disease. CABG surgery is considered as the gold standard for the treatment of unprotected LMCA lesions; however, recent data comparing the efficacy and safety of PCIs using DES and CABG showed comparable results in terms of safety and a lower need for repeat revascularization for CABG.[15)16)] In a meta-analysis of 4 randomized controlled trials,[17)] and a recently published 5-year follow-up study of the SYNTAX trial,[18)] PCI was associated with a higher frequency of MACCE, and a higher risk of target vessel revascularization compared with CABG. So, it has been suggested that all patients with complex multivessel CAD should be reviewed and discussed by both a cardiac surgeon and an interventional cardiologist to reach consensus on the optimum treatment.[18)] For the present case, surgeons were consulted with, and PCI was done as a last resort only.

The choice of stent in elderly patients may depend on the nature of the coronary artery lesions, comorbid conditions, and compliance to a dual antiplatelet regimen. Dedicated RCTs comparing DES and BMS in patients aged >65 years are lacking, and the representation of elderly people in the existing RCTs is also poor.[7)] However, observational data have indicated the superiority of DES over BMS in the elderly population.[19)20)] Sometimes, compliance to dual antiplatelet therapy is a concern in very elderly patients undergoing DES implantation. DES was implanted in the case presented here, and aspirin and clopidogrel were given, and the patient tolerated this dual antiplatelet regimen well.

Percutaneous coronary intervention in the elderly is becoming a more common practice day by day. PCI in the nonagenarian is less common, and rare in the centenarian at present, but with the increase in life expectancy, it may be a commoner practice in the future. A centenarian patient presenting with ACS with an unprotected left main lesion is a real challenge. Meticulous clinical judgment and the adoption of appropriate skills and manoeuvres are needed. A minimum amount of contrast and a simple technique even for complex lesions should be adopted. Optimization of anticoagulation and antiplatelet therapy and minimization of other drugs may help. A multidisciplinary approach is the key to success.

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