PROTEIN C DEFICIENCY IN A PATIENT OF ACUTE MYOCARDIAL INFARCTION

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Abstract

A 42-year old male presented with acute myocardial infarction with no discernable risk factors; he never smoked; did not suffer from diabetes and had a well controlled blood pressure with single medication; plasma concentration of total cholesterol was on the upper normal limit, high and low density lipoprotein, cholesterol and triglyceride being normal. In addition to a single antihypertensive he received Allupurinol (Xanthine Oxidase inhibitor) for hyperuricaemia. Coronary angiogram revealed ectatic epicardial coronary arteries. The patient developed deep vein thrombosis of right leg after four days of the coronary angiogram. Coagulation analysis revealed protein C deficiency. The recognition of protein C deficiency as a risk factor for myocardial infarction is important as anticoagulators prevent further thrombotic events whereas inhibitors of platelet aggregation are ineffective.

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Key words: myocardial infarction, risk factors, protein C deficiency, anticoagulation.

Introduction

A small group of patients with myocardial infarction have none of the usual and well defined risk factors. We report a 42-year male patient with acute inferior myocardial infarction who as a risk factor only had a very well controlled blood pressure and in whom recognition of a coagulation defect led to specific preventive measures.

Case report

In July 2007, a 42-year old male (165 cm, 76 kg) was admitted with an inferior wall myocardial infarction. The patient had never smoked and he did not have diabetes. His blood pressure was well controlled with amlodipine. He did not have any contributory family history, his total cholesterol was in the upper limit of normal range and all other lipids were normal. He was previously diagnosed with hyperuricaemia and was on regular Xanthine Oxidaze inhibitors (i.e. Allupurinol). He did not have any history of renal disease.

The patient presented with severe central chest pain with radiation to left forearm for five hours associated with diaphoresis and palpitation. An ECG showed ST segment elevation in leads II, III and aVF with a rise of CK-MB to 534 and Troponin I to 22.74 units. Transthoracic echocardiography showed mild hypokinesis of basal and mid segments of inferior wall with ejection fraction ~ 50%. Accordingly, the patient was thrombolyzed with Streptokinase uneventfully. Coronary angiogram via femoral arterial route showed ectatic epicardial coronary arteries without any flow-limiting stenosis. No femoral venous puncture was done during the angiographic procedure, the patient was kept under observation with LMWH (Enoxaparin), ASA, clopidogrel, statins and Beta Blockers and Ramipril. Three days after the procedure the patient developed stiffness, swelling and tenderness of right leg and thigh with good ADP, PTA and poplitial pulses. Duplex study of both arterial and venous system of right lower limb revealed deep vein thrombosis of right ileofemoral segment without any echo evidence of puncture site bleeding. The patient was given bolus heparin followed by a maintenance dose of 1200 ml/ hour, APTT ~ 42 sec, INR ~ 2. A full coagulability

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testing showed decreased protein C activity of 57% (normal value >70%). FDP and d-dimer was normal. The patient was anticoagulated with wafarin; the symptoms subsided gradually and the patient was discharged with advice for lifelong warfarin therapy (INR ~ 2-3). At follow up, the patient was feeling well, physically active and resumed his duties.

Discussion

Protein C deficiency is present in approximately 0.2% of the general population. Protein C, a serine protease activated by the thrombin thrombomodulin complex, is part of the infiltrator system of plasma coagulation. Activated protein C exerts a feedback on the intrinsic and extrinsic pathways for inactivation of factors VI and VIIIa in the presence of proteins and phospholipids. It increases fibrinolytic activity, possibly by neutralization of the plasminogen activator inhibitor 1; therefore, deficiency of protein C induces hypercoagulability. The genetic defect is a single point imitation in exon 7 of the protein C gene located on chromosome 2z13-q14.[1] There are two classifications of protein C deficiency; type I, resulting from inadequate amount of protein C present (the protein C functions normally but the amount is insufficient to control coagulation cascade) and type II, characterized by defective protein C, where amount is normal, but is unable to interact normally with other factors implied in coagulation to perform its function.

Protein C deficiency usually manifests as thrombosis of the venous system. The prevalence of arterial thrombosis in 337 heterozygote was 7.1%. It has been suggested that additional vascular risk factors are required for the involvement of the arterial system. A MEDLINE search revealed three detailed publications on patients with myocardial infarction associated with protein C deficiency[2-4] and all these patients had one or more of the other risk factors (smoking, diabetes mellitus, abnormal concentrations of HDL, LDL, fibrinogen, Lp(a) Lipoprotein, as homocysteine). Our patient also had hypertension as a risk factor for coronary artery disease. It may be worthwhile to mention that if the patient did not develop deep vein thrombosis within a few days of the myocardial infarction, the concomitant presence of protein C deficiency might not have been associated with acute myocardial infarction. Our case supports the idea that there is a useful role for measurement of endogenous anticoagulant pathways in assessing patients at risk for arterial thrombosis.[5] A detailed medical history is crucial for an accurate diagnosis and effective prevention of further thrombotic events.

In contrast to other congenital risk factors, there is an effective treatment for protein C deficiency. Whereas platelet aggregation inhibitors such as aspirin and clopidogrel are ineffective, anticoagulation with warfarin (coumadine) or similar drugs prevents further thrombotic events.

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