Effect of Hyperglycemia on The T wave Inversion

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Introduction: Hyperglycemia is a poor predictor for CAD patients post PCI which is associated with an increased risk of death and major adverse cardiovascular events.

Methods: A hypertensive and diabetic 55 yo female came with mild dyspnea on exertion. Her blood glucose is not well controlled with HbA1C at 9.7% due to not adherence to therapy. ECG showed Q-wave on V1-V3. Coronary CTA was performed and showed significant lesion at LAD and first diagonal (D1). Elective PCI with two DES strategy was done at bifurcation lesion of LAD-D1. On the follow-up consultation, her blood glucose was not improving with HbA1C at 10.6% and the follow-up ECG also keep showing deep T-wave inversion. Her HbA1C eventually improved to 9.6%, with random blood glucose at 158 mg/dL at the third follow-up visit (4 months after PCI) and the T-wave became normal at the same time.

Result: This patient has a problem of uncontrol hyperglycemia after PCI with metformin, linagliptin, dapagliflozin and insulin glargine. The ECG changes after bifurcation stenting was not resolved during her blood glucose kept on at high level. When the blood glucose getting better, at the same time the ECG back to normal. The hyperglycemia effect on T-wave inversion might be due to several mechanisms, including shortening of the fibrinogen half-life, increased of fibrinopeptide A, fragments of pro-thrombin in factor VII, and platelet aggregation, all of which could lead to increased activation of thrombosis. Hyperglycemia also associated with increased levels of inflammatory markers, enhanced expression of cytotoxic T-cells, and reduced expression of cytotoxic T-lymphocyte-associated protein, indicating the role of inflammatory immune process. Furthermore, it also could be associated with endothelial dysfunction, oxidative stress, and possibly, abolition of protective ischemic preconditioning.

Conclusion: Hyperglycemia might have contribution in the persistent T-wave inversion after coronary stenting via several mechanisms. Therefore, blood glucose lowering to desired target is an important factor included in the management strategies in improving both short-term and long-term outcomes after coronary stenting in diabetic patients.