Effect of olanzapine, risperidone and quetiapine on the endothelium- and sympathetic nerve-dependent regulation of smooth muscle activities in rat mesenteric arteries

Han-Hsuan Yeh¹, Mei-Fang Chan¹, Tony Jer-Fu Lee¹

¹CVMRC, Department of Medical Research, Buddhist Tzu Chi Hospital, Hualien, Taiwan

Olanzapine, quetiapine and risperidone are antipsychotics used for schizophrenia, autism and bipolar disorder. Their effect is based on the blockade of receptors in the brain dopamine pathway. These receptors are also active in regulation of arterial tensions. Therefore, this study aims to examine how olanzapine, quetiapine and risperidone affect the rat mesenteric arterial tones by using the blood-vessel myography. The contractions induced by phenylephrine (an α-adrenoceptor agonist) were inhibited by olanzapine, quetiapine and risperidone in mesenteric arteries (MA) with IC₅₀=1, 3 and 0.03 μM, respectively. However, the U46619 (a thromboxane A2-receptor agonist)-induced contractions were little affected by them. On the other hand, the acetylcholine-elicited relaxations were concentration-dependently inhibited by olanzapine and quetiapine but not by risperidone in endothelium-intact MA. No inhibitory effect of the three agents on the sodium nitroprusside-induced vasodilations was observed. Furthermore, the nerve stimulation-provoked contractions of MA were also inhibited by these antipsychotics with a greater potency for risperidone. These results indicate that olanzapine, quetiapine and risperidone differently suppressed the receptors-mediated contractions and relaxations in MA, which may relate to the hypotensive condition observed in clinics.

Keywords:090, 534, 024