Shock wave irradiation accelerates angiogenesis and osteogenesis. Thus, it could be possible that shock wave induce physiological responses in cells. At cellular level, shock wave irradiation evokes the intracellular Ca\(^{2+}\) increase. In this evoking, actin cytoskeleton is involved. To verify this involvement of actin cytoskeleton in the evoking of intracellular Ca\(^{2+}\) increase, elasticity of cell substrates was altered to control actin cytoskeleton in bovine aortic endothelial cells. The elasticities used in this study were ~10 kPa through ~1 MPa. Elasticity was altered by altering ratio of base and curing agents of PDMS. When elasticity of cellular substrate was lowered, the intracellular Ca\(^{2+}\) increase represented 2 patterns: one is that Ca\(^{2+}\) increase with the second and subsequent irradiation and another not increase. Thus, it was further suggested that actin cytoskeleton is involved in shock wave irradiation induced intracellular Ca\(^{2+}\) increase.