In ventricular cells, intracellular calcium serves as a second messenger that modulates current and electrical potential difference between the interior of the cell and the extracellular space. This regulation is essential to proper cardiac function. We present a numerical model incorporating components from the Bueno-Orovio et al. minimal model of the cell membrane potential and the Shiferaw et al. intracellular calcium model in ventricular myocytes. The combined model is a series of nonlinear differential equations which specify the response of the cell membrane and the intracellular calcium concentration to an electrical stimulus. The model allows voltage to influence calcium through a transmembrane current of calcium ions and allows calcium to affect the closure of ion channels, thereby influencing voltage. The two-way coupling permits the formation of alternans, a period-2 dynamical state, to occur through instabilities in voltage or calcium and can be used to study alternans properties in both cases. (Received September 04, 2014)