Background: Although several experimental studies have exhibited possibility of angiotensin receptor blocker as the upstream therapy for atrial fibrillation (AF), plural clinical trials have questioned about its effect. The mechanism of this discrepancy might be explained by imbalanced suppression of the renin-angiotensin system such as aldosterone breakthrough phenomenon, and direct renin inhibitor (aliskiren) is expected to achieve balanced suppression. We evaluated the effect of aliskiren on AF in the canine AF model. Methods: 9 dogs with atrial rapid stimulation were divided into 2 groups; 1) aliskiren group (n=5): rapid atrial pacing for 6 weeks with aliskiren (30mg/kg/day), and 2) control group (n=4): rapid pacing without any medication. Atrial effective refractory period (AERP), conduction velocity (CV), AF inducibility were evaluated in every week during the 6 week protocol. Results: The control group exhibited gradual AERP shortening and CV decrease along the time course as previously reported. In the aliskiren group, AERP shortening was not affected, but CV decrease was suppressed in comparison with the control. The AF inducibility was gradually increased in the control, but it was suppressed in the aliskiren group (p<0.05). Conclusions: Aliskiren suppressed the increase of AF inducibility and decrease in CV in the canine AF model. Aliskiren might be a possible tool for the upstream therapy for AF. Keywords: atrial fibrillation, aliskiren