Background: A rocking motion of the LV apex has been observed in patients with myocardial infarction (MI). There is, however, limited understanding of the mechanisms causing this phenomenon. We hypothesized that LV apical rocking is caused by an imbalance of contractile forces due to asymmetrical infarct extent.

Methods: We studied 30 patients with previous MI and visual signs of apical rocking. Using speckle tracking echocardiography from 4-chamber views, apical rocking motion was quantified as net longitudinal motion of the LV apical region. Shortening (strain) during ejection was measured in septal and lateral segments. Infarct extent was determined by contrast enhanced MRI and expressed as a percentage of total segment area.

Results: The apical parts of LV septum and lateral wall showed net rocking motion (4.7±2.6 mm (mean ± SD)). The apex was pulled towards the wall that demonstrated greatest shortening (10.3±4.9 %) and away from the wall with the least shortening (6.2±3.9 %, p<0.01), indicating an imbalance of contractile forces between the two walls. The correlation between Δstrain and net LV displacement was R=0.39, p<0.05. The difference in infarct size between the walls was 8.5±11.2 %, p=0.01, with the greatest extent of scarring in the wall with the least shortening. Mean QRS-duration was 100 ± 30 ms.

Conclusions: Asymmetrical infarct distribution may cause LV apical rocking. This may have implications for interpretation of tissue Doppler velocities, as apical rocking of an ischemic area will imitate normal myocardial velocities. Myocardial strains, however, will easily discriminate between ischemic and non-ischemic areas.