Ex-vivo assessment and non-invasive in vivo imaging of internal hemorrhages in Aga2/+ mutant mice.

Abstract:
Mutations in type I collagen genes (COL1A1/2) typically lead to Osteogenesis imperfecta, the most common heritable cause of skeletal fractures and bone deformation in humans. Heterozygous Col1a1(Aga2/+), animals with a dominant mutation in the terminal C-propeptide domain of type I collagen develop typical skeletal hallmarks and internal hemorrhages starting from 6 day after birth. The disease progression for Aga2/+ mice, however, is not uniform differing between severe phenotype lethal at the 6-11th day of life, and moderate-to-severe one with survival to adulthood. Herein we investigated whether a new modality that combines X-ray computer tomography with fluorescence tomography in one hybrid system can be employed to study internal bleedings in relation to bone fractures and obtain insights into disease progression. The disease phenotype was characterized on Aga2/+ vs. wild type mice between 6 and 9 days postnatal. Anatomical and functional findings obtained in-vivo were contrasted to the ex-vivo appearance of the same tissues under cryo-slicing.