Hua Su, J Neurol Disord 2015, 3:3
http://dx.doi.org/10.4172/2329-6895.S1.002

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International Congress on
Neuroimmunology and Therapeutics
DoubleTree by Hilton Hotel San Francisco Airport, San Francisco, CA, USA

Impact of bone fracture on stroke recovery

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Stroke is the leading cause of disability in adults and an important risk factor for bone fracture. Alternatively, stroke is one of the most devastating complications of bone fracture. In the United States, approximately 70,000 stroke victims suffer from bone fracture within the first year after their stroke. Reported date showed that about 0.2% to 4.1% patients suffer from stroke after hip surgery. However, the impact of bone fracture on stroke recovery has not been fully studies. We have studied the influence of bone fracture shortly before or after ischemic stroke on stroke recovery in a mouse model. We found that bone fracture increases alarmins and pro-inflammatory cytokines in the blood and increase stroke related injury as well as functional deficits through augmenting the neuroinflammatory response. Mice with stroke and bone fracture have more severe functional deficits, larger infarct sizes, and more CD68+ macrophages in the peri-infarct region than mice that have stroke only. Bone fracture also increases oxidative stress in the injury and promotes pro-inflammatory polarization (M1) of macrophage. Anti-inflammatory therapies reduce the negative impact of bone fracture on stroke recovery.

In a clinical study, we found hip fracture patients with advance age are prone to have ischemic stroke and higher CHADS2 score and neutrophil counts are risk factors for post-fracture ischemic stroke. Prior bone fracture history is an independent risk factor for ischemic stroke. These findings could help doctors identifying fracture patients that at risk of post-fracture stroke and providing preventive therapies to these patients before surgical fixation.

Biography

Hua Su, MD, is Professor and the Associate Director of Basic Science Research at the Center for Cerebrovascular Research, Department of Anesthesia and Perioperative Care at the University of California, San Francisco.

Su is an experienced vascular biologist. Her long-term research interest is to develop therapeutic strategies that can improve outcomes in patients with vascular disease. Her current research projects are (1) Cerebrovascular malformation modeling, mechanistic study and new therapy development, and (2) Impact of peripheral injury on stroke recovery.

Su was born in China, where she obtained her degree in Medicine in 1982. In 1989, she undertook a Postdoctoral Research Fellowship at University of California, San Francisco. She joined the faculty at University of California, San Francisco in 1996 and led a group developing gene based therapies for cancer, myocardial infarction and ischemic limb diseases. She was recruited to the Center for Cerebrovascular Research in 2008. Since then, her research was focused on identifying disease mechanisms and developing new therapies for cerebrovascular diseases and ischemic stroke.

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