INTRODUCTION
Spinal cord chronic compression-induced cervical myelopathy is a common cause of spinal cord dysfunction. The disease generally leads to impairment of the sensory and motor function of the cord progressively. However, the precise mechanism and the underlying pathophysiology of myelopathy remain under investigated [1-3]. The establishment of animal model which reproduce the clinical condition of cervical myelopathy would be helpful for better understanding to the disease [3]. This study aims to establish a rat model of spinal cord chronic compression.

MATERIALS AND METHODS
Animal model
Total 15 adult Sprague-Dawley rats were used. After general anaesthesia, the laminae of C3-C7 were exposed and a small space around facet was opened. A water-absorbing urethane-containing polymer, which would expand upon absorbing tissue fluid, was inserted into the spinal canal at lateral side of the C5-C6 region.

Post-operative evaluation
Magnetic Resonance Imaging: Axial T2W and diffusion tensor images (DTI) of the C3-7 spinal cord were acquired in vivo using a 7T Bruker PharmaScan 70/16 scanner. Respiration gated 4-shot SE-EPI sequence with navigator echo was used with the following parameters: TR/TE=3000/29ms, δ/Δ=3.5/17ms, slice thickness=2mm with 0.2mm inter-slice gap, FOV=30mm, data matrix=128x128, NEX=4. Diffusion encoded gradients with b=0.8ms/µm² were applied along 30 directions. Fiber tracking were performed by DTI Studio with FA threshold = 0.2, tracking was stopped if FA <0.15 or turning angle >450.

Micro-Computed Tomography: After harvest of rat spinal cord, the specimens were processed for micro-CT scanning at the isotropic pixel size of 9µm (Skyscan-1076, Belgium). The 3D images of spinal cord were reconstructed.

Histology: rat spinal cord was embedded in wax and sectioned to 8µm for H&E and luxol fast blue staining.

RESULTS
Under DTI and micro-CT evaluations, disruption of fibers continuity and distortion of both white and gray matter of spinal cord were noted at compression site (Fig 1&2). Under histological evaluations, the number of cells decreased in gray matter with cavitations in white matter, concomitant with increased blood vessels after chronic compression, which successfully mimic the histopathological feature of CM under post-mortem examination in patients.

CONCLUSIONS
A rat model of spinal cord chronic compression has been successfully established to mimic clinical scenario of CM in patients. It will be used for understanding of nature history of CM onset and progression, also for development of therapeutic strategy and modalities.

REFERENCES
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