以個人電腦找出頭部電腦斷層影像之中線並模擬病變過程

Finding the midline shift on CT and morph it back with a personal computer

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OBJECTIVE: Tracing the shifted midline on a slice of brain CT, 'pulling' it back into a straight line, and generating 'in-between' images with a personal computer.

METHODS: The upper and lower segments of cerebral falx were obtained with region-growing and thresholding algorithms, and then a spline was fitted to maximize the symmetry between both sides of it. Elastic deformation was applied to the compressed hemisphere to 'pull' the midline back, then the mirror image was pasted to the lesion side. A morphing algorithm was then executed with control lines set at midline, the internal capsule, ventricular walls and outline of the hematoma.

RESULTS: This method was applied to a CT slice obtained from Neurosurgery online database. A multi-GIF image showing the transition from normal to abnormal image was generated. Shift of each pixel can be mapped in terms of magnitude and direction.

CONCLUSION: This method is useful for depicting shift of each brain structure in addition to midline, and can be applied to single or serial images. It is easily implemented on personal computers.

Keywords: Midline shift, Image morphing, Personal computer