Clinical Applications of Brain Computed Tomography Angiography with Subtraction

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Abstract

In the past few years, Computed Tomography Angiography (CTA) has become one of the popular diagnostic tools for cephalic and cervical vascular diseases. Most of the diagnostic tools in the market are unable to create clear vessels images due to the overlapping images of bones and veins of the skull base and cervical spine’s blood vessel. This disadvantage can be overcome by CTA through its three-dimensional reformation that can easily clarify the overall vessels images. Subtraction technology can readily remove the bones images giving a clear picture of the vein images. The subtracted CTA technology is recommended over the use of Magnetic Resonance Angiography (MRA) technology because CTA can create better and higher resolution images. CTA also reduces flow-related artifact thus enabling clearer images. Furthermore, the CTA subtraction is much more user friendly therefore slowly is taking over the Digital Subtraction Angiography (DSA) market share. From March 2008 to May 2009, there were 44 patients that joined the clinical applications study with the assistant of experienced operator. This study focusing on the differences of timeline between the traditional three-dimensional rendering of the skull base with the subtraction technology. The study result was analyzed by senior nerve radiation specialists. The study showed that the traditional three-dimensional rendering of the skull base takes 19–32 minutes while subtraction technology takes 4–10 minutes. Furthermore, from these 44 cases, the subtraction technology has 82% successful rate. Most of the unclear images are caused by patients during their radiation session. Patients are unable to keep still during the session. Overall, the subtraction technology can overcome many of the traditional CTA disadvantages. The subtraction technology is user friendly, efficient, and give higher quality of vessels images. The development of subtracting technology under clinical expansion and application has become an important task.

Keywords: CTA, Subtraction, MRA, DSA