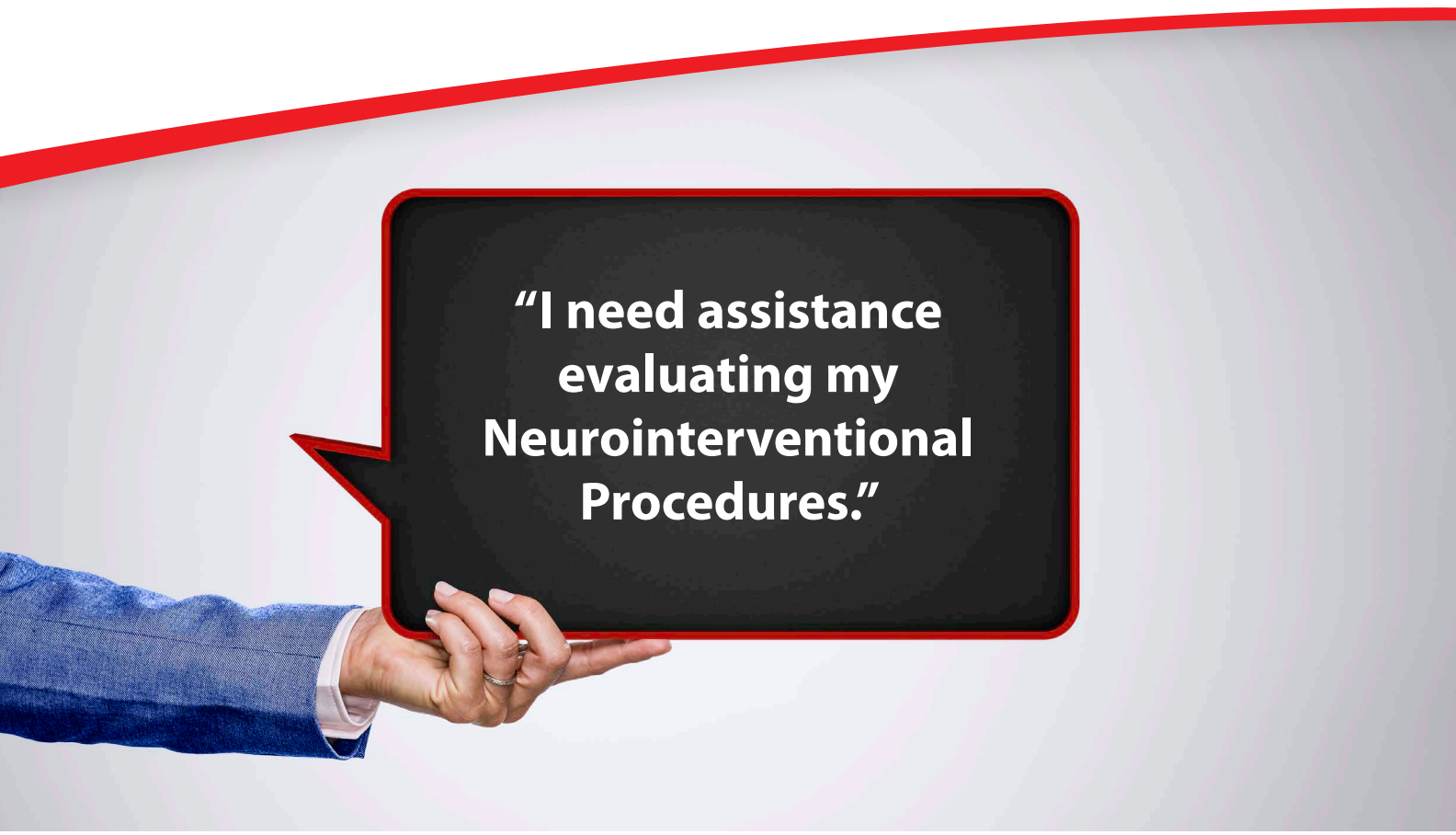
TOSHIBA
Leading Innovation

Neuro-Vascular Clinical Case Study

Neurointerventional Procedure Evaluation with Parametric Imaging Software



USE

Parametric imaging software assists with the visualization of hemodynamic properties in neurological interventional procedures. More specifically, parametric imaging calculates parameters from time-density curves for each pixel of a 2D DSA image of the intracranial vascular anatomy and color codes each pixel based on the respective calculated value for display on the parametric image. The resulting parametric imaging maps can enhance the assessment of hemodynamic parameters and therefore support the treatment decision and its evaluation. Comparison of pre and post procedural parametric imaging maps can help in the visualization of blood flow changes.

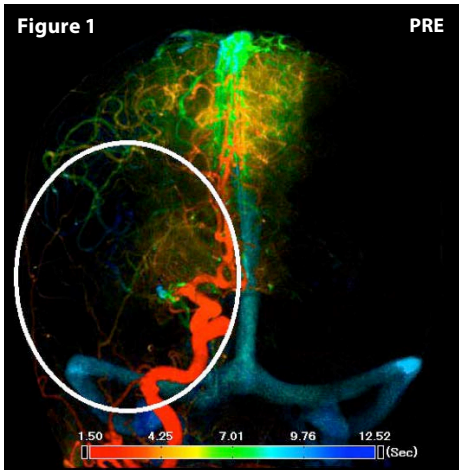
HISTORY

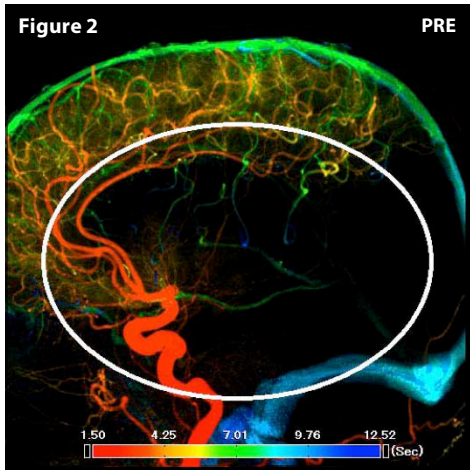
A 56-year-old female patient presented with signs of stroke, facial drooping, arm weakness and difficulty speaking. The patient arrived at the emergency room of a hospital with the Gold Plus rating by the American Heart Association/American Stroke Association and went through a stroke protocol of a non-contrast CT of the brain and oxygen saturation, blood glucose, complete blood count, serum electrolytes/renal function tests, markers of cardiac ischemia, prothrombin time (PT), activated partial thromboplastin time (aPTT) and electrocardiogram (ECG). After all results had been reviewed, the patient was referred to a neurointerventionist for evaluation and treatment.

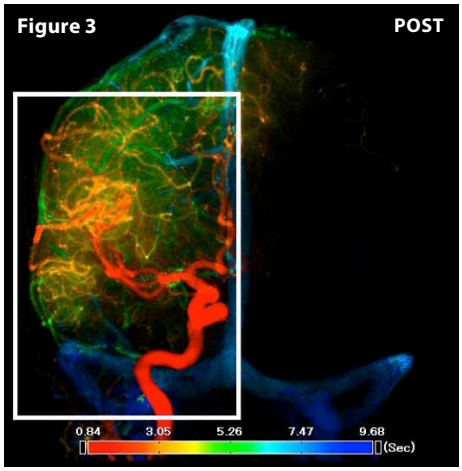
TECHNOLOGY

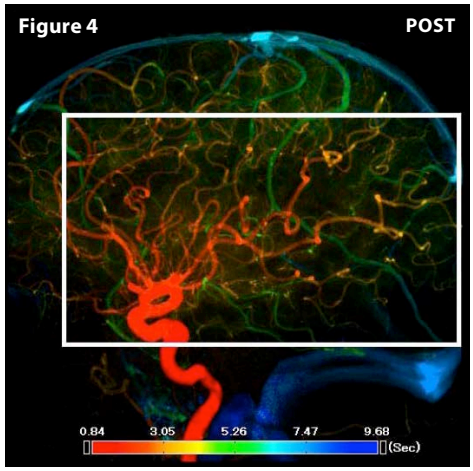
Parametric imaging software on the Toshiba Infinix Elite Angio Workstation (AWS) was utilized in conjunction with the Toshiba Infinix Elite bi-plane system. Parametric imaging was applied to a time sequence of 2D DSA images following the injection of contrast material before and after the procedures. Parametric imaging color coded maps of different time-density curves were calculated:

- **Time To Peak (TTP):** Time required to reach the maximum contrast medium density.
- **Peak Height (PH):** The maximum pixel value for each pixel.
- **Area Under Curve (AUC):** The cumulative pixel value for each pixel.
- **TTPα:** The brightness corresponding to PH is applied to each pixel whose color is determined according to TTP.









Toshiba's parametric imaging software enhances the visual assessment of blood flow properties in the brain. The oval regions in the pre-intervention panels (Figures 1 and 2) show lack of circulation in the right hemisphere of the cranium. The rectangular regions in Figures 3 and 4 show restored flow to the right hemisphere of the cranium after the intervention.

FINDINGS

Patient underwent an angiogram of the right carotid artery and intracranial vessels. A stenosis of the right internal carotid artery was identified and treated with clot extraction followed by an angioplasty with stent placement. Pre- and post-procedure parametric imaging TTPα color-coded maps were used to enhance the visual assessment of blood flow.

CONCLUSION

Parametric imaging color-coded software on Toshiba's Infinix Elite AWS in conjunction with the Toshiba Infinix Elite bi-plane system 2D DSA imaging aided the physician in the assessment of blood flow restoration to the right hemisphere of the patient's brain following the treatment of stroke with stent placement in the right internal carotid artery.

Toshiba gives you a voice. What's yours?

2441 Michelle Drive, Tustin CA 92780 / 800.421.1968 medical.toshiba.com

VLCS12443US