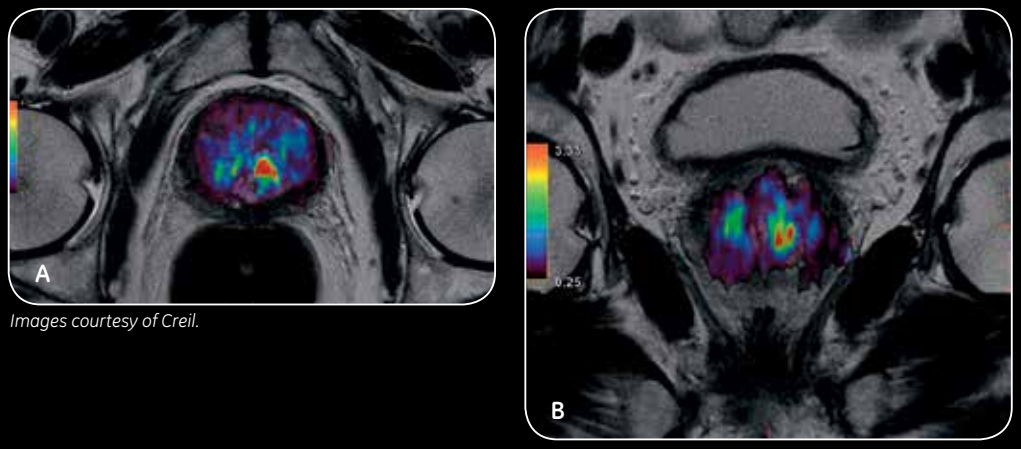


Images courtesy of Creil.

Figure 1. T2 PROPELLER Axial (A) and T2 PROPELLER Coronal (B) images fused with a k-trans map depict a region of the transition zone measuring 12 mm paramedian left with a suspicious T2 hypointense signal intensity distribution, high value K-trans, and hyper perfusion. Note the ambiguous region at the right transition zone with a moderate decrease in the ADC value.

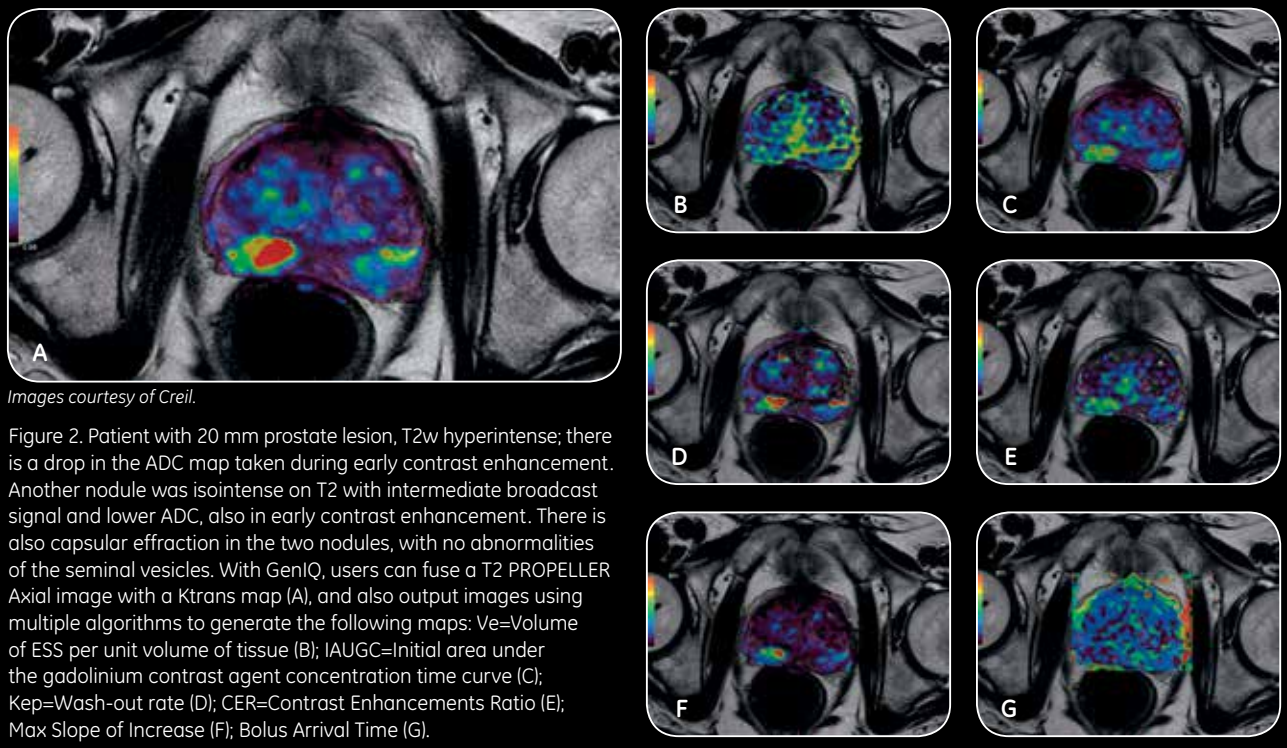
GenIQ – A Quantified Analysis to Assess Vascular Properties in Lesions

GenIQ is a new post-processing application for assessing the vascular properties of brain, liver, prostate, and breast tumors for initial as well as follow-up examinations. Key features include vascular input function detection, pharmo-kinetic (PK) modeling parameters, and motion registration image fusion. Using MRI data sets from multiple examinations, it automatically processes dynamic changes in signal intensity to calculate and generate parametric images related to blood flow in the tissue and leakage of the contrast agent. The output analysis can then be fused with any datasets acquired in the current exam.

As a READY View application, GenIQ is available virtually anywhere—on a PC, laptop, PACS, or AW workstation. It provides a comprehensive, multi-parametric assessment in a single acquisition with data that can be used for World Health Organization (WHO) and Response Evaluation Criteria in Solid Tumors (RECIST) evaluation criteria.

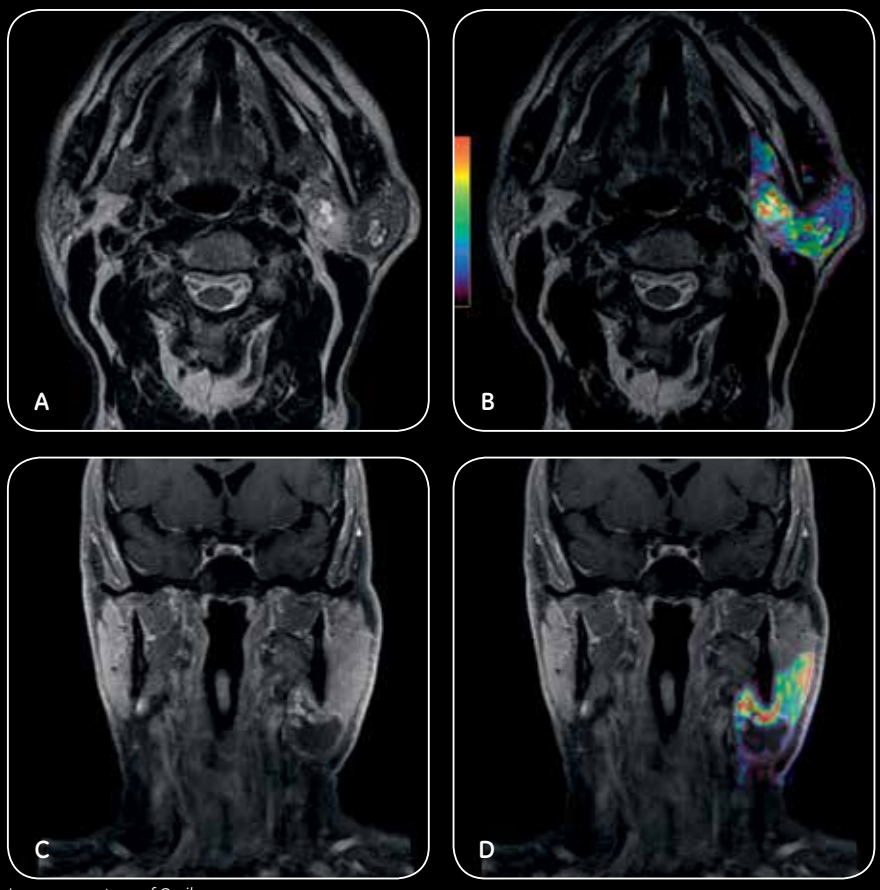
Since GenIQ provides PK modeling parameters, function, and semi-quantitative parameters measuring contrast uptake, arrival, and wash-out times, it can help clinicians address three important aspects of MR oncological imaging: angiogenesis, T1w perfusion, and PK modeling.

- **Angiogenesis** is the formation of new blood vessels, and tumors need blood vessels to grow and spread. There are several approved angiogenesis inhibitors designed to prevent the formation of new blood vessels and therefore help stop or slow down the spread and growth of the tumor.
- **Perfusion** is often disturbed by the disease process. Monitoring this physiological parameter can provide additional insight into disease and, therefore, perfusion measurements are often performed in nearly all organs using a variety of techniques. In MR, T1w perfusion imaging is performed using a multi-phase 3D T1w acquisition (e.g., 3D FSPGR, LAVA, DISCO, and VIBRANT) with high temporal resolution, typically inferior to 10 seconds/phase.
- **A PK model** is a mathematical approach to simulate contrast agent exchange between the intravascular space (arteries, veins, capillaries) and Extracellular Extravascular Space (EES) or interstitial space. In MR imaging, this approach reflects the contrast agent concentration in the tissue of interest and is not influenced by scanning conditions, such as the contrast agent injection procedure, the scanner settings (including the pulse sequence, gain and scaling factors), and the target position in the image.



Images courtesy of Creil.

Figure 2. Patient with 20 mm prostate lesion, T2w hyperintense; there is a drop in the ADC map taken during early contrast enhancement. Another nodule was isointense on T2 with intermediate broadcast signal and lower ADC, also in early contrast enhancement. There is also capsular effraction in the two nodules, with no abnormalities of the seminal vesicles. With GenIQ, users can fuse a T2 PROPELLER Axial image with a Ktrans map (A), and also output images using multiple algorithms to generate the following maps: Ve=Volume of ESS per unit volume of tissue (B); IAUGC=Initial area under the gadolinium contrast agent concentration time curve (C); Kep=Wash-out rate (D); CER=Contrast Enhancements Ratio (E); Max Slope of Increase (F); Bolus Arrival Time (G).



Images courtesy of Creil.

Figure 3. T2 PROPELLER Axial without (A) and with fusion (B) of the kTrans map showing rapid enhancement of a lesion in the neck. T1 IDEAL Coronal post contrast without (C) and with fusion (D) of the kTrans map.