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A big step in MRI of neonates and young children

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The MRI team at the University of Bonn, Germany

A big step in MRI of neonates and young children

The University of Bonn takes advantage of Ingenia 3.0T for enhancing MRI of their youngest patients

Radiologists at the University of Bonn, Germany have been putting their [Ingenia 3.0T](#) through its paces with highly positive results. Pediatric imaging is one of the areas where the system performance is impressive, with the combination of high resolution and high speed producing excellent imaging. In addition, the large bore also makes handling of young children easier.

High spatial resolution and high speed are essential

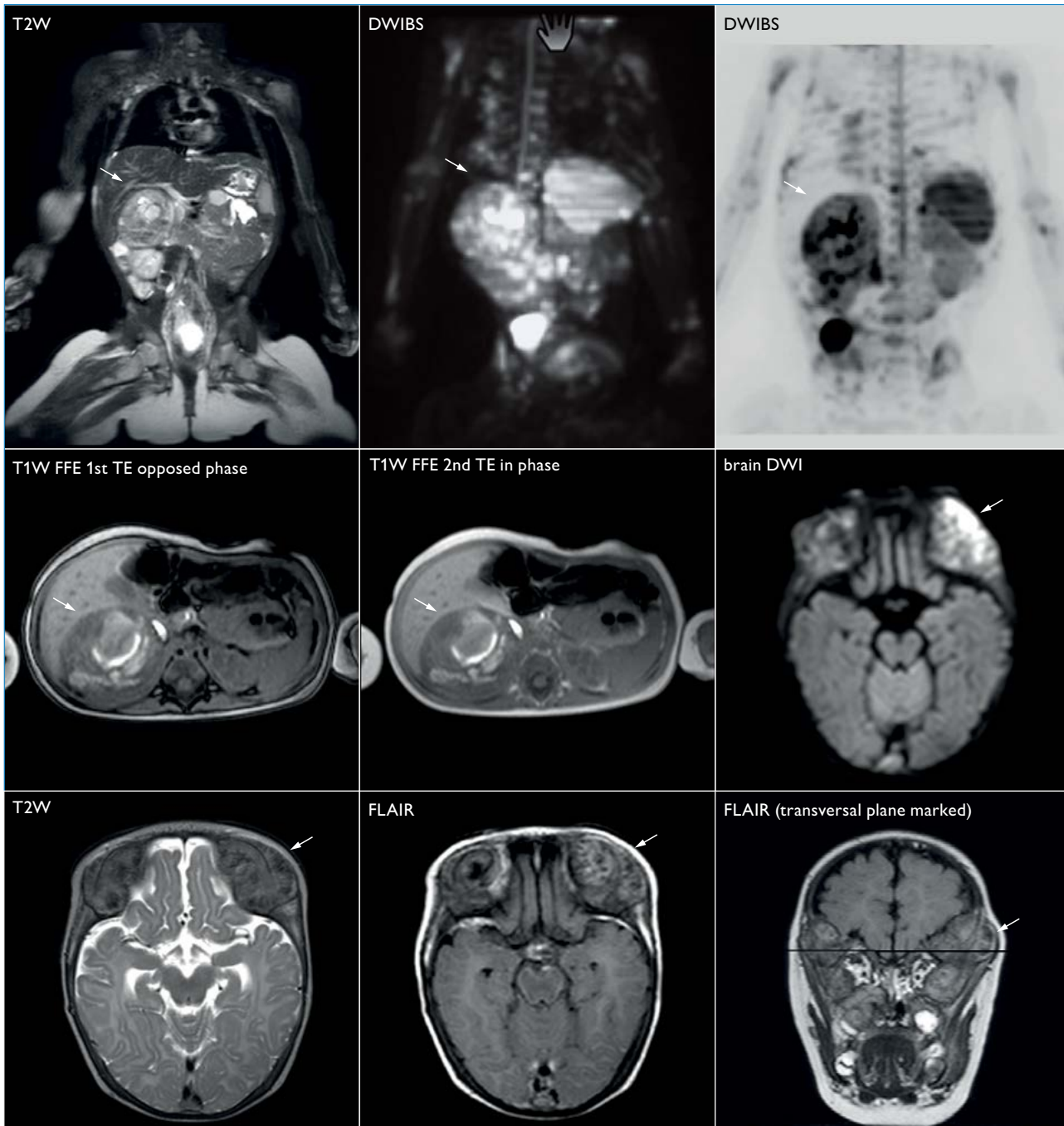
“Although pediatric imaging covers a very broad spectrum of patients, it’s especially in the areas of neonates and very young children that the benefits of the Ingenia 3.0T can really be appreciated,” says Winfried A. Willinek, MD, Professor of Radiology at the University of Bonn. “For newborns in particular, the system’s exceptionally high spatial resolution allows us to easily visualize the tiny anatomy of our patients. And we can also invest the high SNR that comes from Ingenia’s digital architecture into developing fast protocols.”

“Fast imaging is particularly important for newborns, neonates and infants, because these patients are most of the time sedated or anesthetized during the exam, and it’s essential that the time under anesthesia should be kept as short as possible,” Dr. Willinek points out. “On a 1.5T system,

especially whole body applications are time consuming, with even more sequences on the wish list. A fully comprehensive exam could easily double the examination time, which is not practical. Now, on Ingenia 3.0T we have developed comprehensive multiple-station protocols with exam times of less than 45 minutes. This is seen by our anesthesiologists and pediatricians as a really positive development in pediatric imaging.”

Wide bore benefits children and parents alike

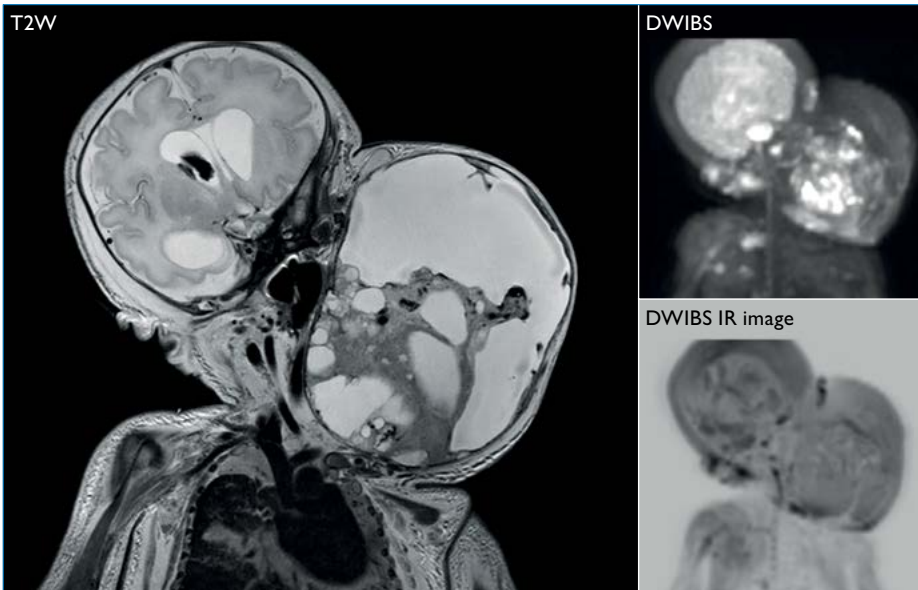
“Much has already been written on the benefits of Ingenia’s wide 70 cm bore and how it eases patient stress and patient handling,” observes Dr. Willinek. “And in pediatric imaging these benefits go even further by also allowing a parent access to the child during the exam. The wide bore allows a parent to comfort the child during the exam.”



Neuroblastoma in 1.5-year-old

1.5-year-old girl with neuroblastoma in whole body and lesions in left and right side of the head, including the face. In abdomen mFFE is done with TE 1.15 ms and TE 2.3 ms. The plane of the transverse head images is marked on the coronal FLAIR.

“The Ingenia 3.0T’s large, homogeneous field of view plus its high SNR and advanced coil handling concept allow us to easily adapt to a whole body approach.”



Giant teratoma in neonate

A neonate with a giant teratoma from the throat underwent an MRI exam prior to surgery. High-resolution T2-weighted imaging demonstrates the anatomical and morphological situation. Ingenia 3.0T is used with the dS HeadNeck coil top. Voxel size is $0.50 \times 0.55 \times 3$ mm in T2W.

“The wide bore allows a parent to comfort the child during the exam.”

Exams customized to each patient

Typical scans are difficult to describe since the patients' conditions cover a broad spectrum from epilepsy to bone tumor. “If you talk about adolescents you can usually call on a typical ExamCard but with young children it's very individual and much more of a challenge to the whole team,” Dr. Willinek explains. “Basically we have several ExamCards addressing the fact that even for the exact same clinical question we often need different protocols for, say, a neonate than for a 5-year-old. So, although we have several standard ExamCards covering each age group, these all have to be individually customized to each patient.”

Easy extension to whole body imaging

According to Dr. Willinek, referrals of small children for an MRI exam frequently have either neuro or oncology indications so that exam protocols may often have to extend to whole body imaging. “A typical indication is neuroblastoma, a malignant tumor that can metastasize to various locations in the body. The Ingenia 3.0T's large, homogeneous field of view plus its high signal-to-noise ratio and advanced coil handling concept allow us to easily adapt to a whole body approach,” he explains. “If the tumor is located in the abdomen we can take advantage of the system's exceptionally homogeneous signal to produce superb DWIBS (whole body DWI) images. And now we come to another important benefit of the system. We are also able to use

DWIBS as a kind of PET-like imaging technique that can be used not necessarily for primary diagnosis but later to visualize lesions during follow-up after chemotherapy. This is completely different to our experiences at 1.5T.”

The Bonn team uses the same coils as are used for adults. According to Dr. Willinek a particularly useful coil is the dS HeadNeck coil, which serves as a very high quality whole body coil. “We find this works very well, especially for neonates, although we do have the dedicated Philips neonatal coil on our wish list.”

For older children, they use a combination of the dS HeadNeckSpine coil solution with the anterior/posterior body coil. In addition, for more comfortable positioning a tunnel is used to avoid the direct positioning of the anterior coil on the child.

4 to 6 times faster imaging in clinical routine with dS-SENSE

The Ingenia's high SNR can also be invested into higher parallel imaging factors, even in the range of dS-SENSE factors between 4 and 6 for body imaging. “Ten years ago we were talking of SENSE factors of 2 or 4 for the brain, never dreaming that we would be able to achieve these high factors for body applications, but this is now standard for us on the Ingenia 3.0T for both pediatric and adult imaging,” says Dr. Willinek. ■