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Fusion imaging of Time Resolved Imaging of Contrast KineticS (TRICKS) and high resolution volumetric T2 MR sequences in the evaluation of spinal vascular malformations

Abbreviations

TRICKS	Time Resolved Imaging of Contrast KineticS
SDAVF	spinal dural arteriovenous fistula
SCAVM	spinal cord arteriovenous malformations
MRI	magnetic resonance imaging

Spinal vascular malformations are relatively uncommon and heterogeneous group of disorders comprising predominantly spinal dural arteriovenous fistula (SDAVF) and cord arteriovenous malformations (SCAVM). They are evaluated using gold standard imaging investigation, spinal angiography [1], which is invasive, time consuming and requires radiation exposure and contrast administration. Recent studies with TRICKS and high resolution T2 weighted volumetric (CUBE) MR sequences have demonstrated a high degree of accuracy in the diagnosis and localisation of SDAVFs [2,3]. In this article, we show the usefulness of fusion imaging of these two MR sequences in the characterization and localisation of SDVAF and SCAVM.

These two MR sequences were obtained on 3.0T MRI in two patients with SCAVM (Fig. 1) and SDAVF (Fig. 2) and findings were correlated with invasive spinal angiography. Parameters used for acquiring CUBE sequence are as follows: TE/TR 60-115/2500 ms, ETL 90, FOV 30 cms with a matrix of 288 × 288 and slice thickness of 1.6 mm in the sagittal plane. The entire spine was covered in 2 stations. The total time of acquisition for each station was 6:08 minutes. Parameters used in TRICKS sequence are as follows: TE/TR 1.4–11/3.7 ms, flip angle 20°, slice thickness of 2 mm with no section gap and FOV of 46 cms, matrix of 512 × 256, NEX of 0.75 with 20 phases acquired in the sagittal plane in a time period of 1:15 minutes with a temporal resolution of 3.1 seconds. The sequences were combined using proprietary image fusion software (GE Healthcare) and appropriate oblique reconstructions were created for characterisation and optimal demonstration of feeder of vascular malformation. The vessels were colour-coded for easy interpretation.

The CUBE sequence provides high spatial resolution and excellent CSF- parenchymal tissue interface and this helps trace the draining vein to the possible origin of the fistula. However, this sequence lacks temporal information and cannot distinguish arteries from veins. The TRICKS sequence on the other hand, has superior temporal resolution albeit with poor spatial resolution and inadequate longitudinal coverage [2,3]. Fusion of these two sequences combines the advantages of both and helps in improved characterisation of vascular malformation and its localisation, which in turn helps in preoperative planning.

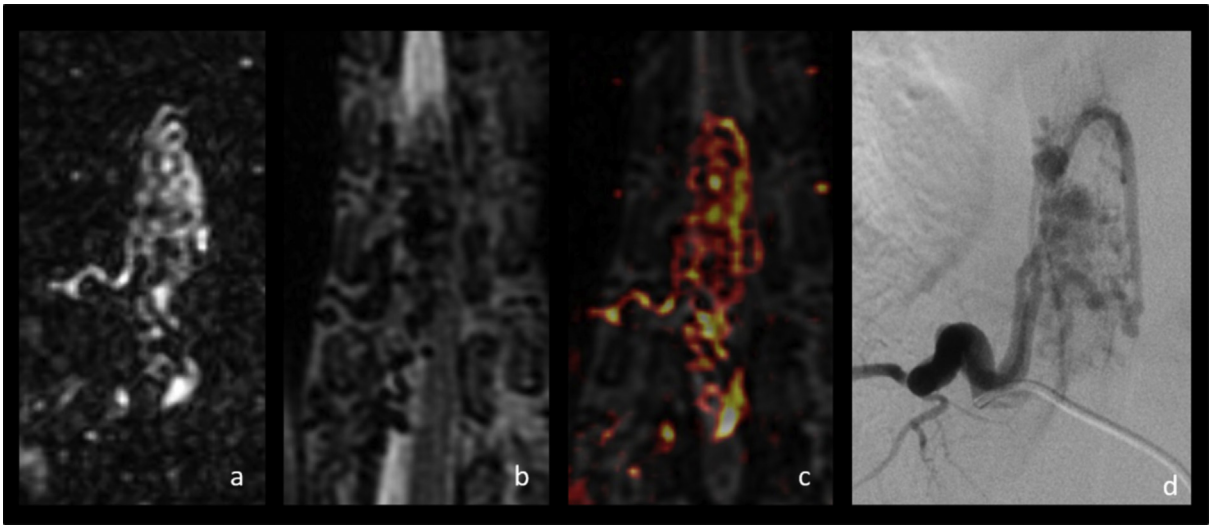

Fig. 1. a: Time Resolved Imaging of Contrast KineticS (TRICKS) image shows vessel outline with no anatomical detail; b: CUBE image showing multiple flow voids with no differentiation between arteries, nidus or draining veins; c: fusion image shows good anatomical details with feeding artery and nidus; d: DSA image confirming the feeder and nidus.

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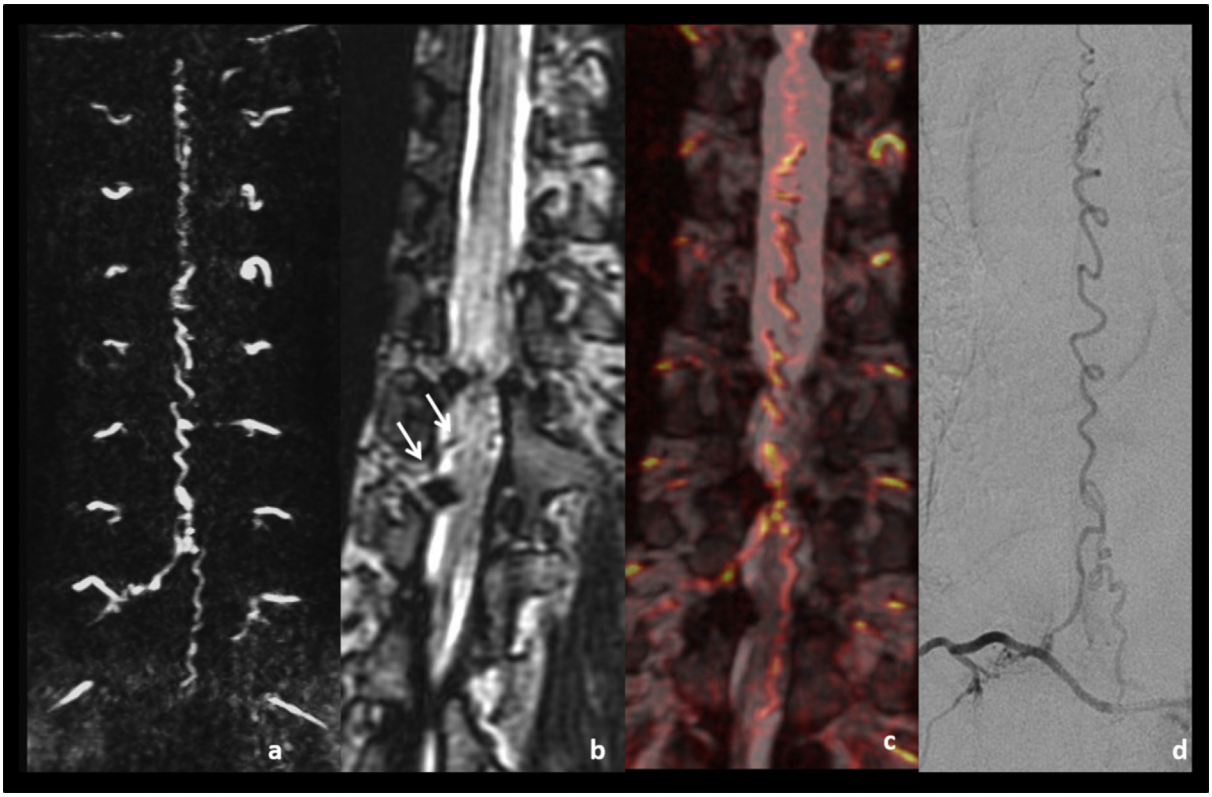

Fig. 2. a: arterial phase image of Time Resolved Imaging of Contrast KineticS (TRICKS) image shows vessel outline with poor spatial resolution; b: CUBE image showing flow void (arrow) in spinal canal and exiting the neural foramen in thoracic level, identifying the feeder; c: fusion images show good anatomical details with differential contrast; d: DSA confirming the feeder level.

Disclosure of interest

The authors declare that they have no competing interest.

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Congenital Zika syndrome and cerebellar cortical problem

Dear Editor,

we read the publication on "Congenital Zika syndrome associated with findings of cerebellar cortical dysplasia - Broadening the spectrum of presentation of the syndrome" with a great interest [1]. In fact, Zika virus infection can result in a very wide clinical spectrum with the common presentation being asymptomatic [2]. Cerebellar involvement in congenital Zika virus syndrome is not uncommon but scarcely mentioned in the literature [3]. In the report by Melo et al. [3], cerebellar hypoplasia was observed in all cases with congenital Zika syndrome [4]. Since the clinical presentation of cerebellar abnormality might be more difficult for detection than that of cerebral abnormality, the practitioner can easily under recognize the cerebellum problem in these patients. For any cases of congenital Zika syndrome, the investigation on all parts of the neurological system is recommended.

Disclosure of interest

The authors declare that they have no competing interest.

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