

Demonstration of perivascular echogenicities in congenital cytomegalovirus infection by colour Doppler imaging

M. Ries, K.-H. Deeg, and U. Heininger

Department of Paediatrics, University of Erlangen, Loschgestrasse 15, W-8520 Erlangen, Federal Republic of Germany

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Abstract. Two children with congenital cytomegalovirus infection and intracerebral echogenicities were investigated by computer sonography and colour Doppler imaging (CDI). By simultaneous imaging of brain tissue and CDI, blood flow within the stripe-like echogenicities of the basal ganglia was demonstrated. Using CDI the echogenicities were identified as the walls of thalamostriate vessels.

Key words: Colour Doppler imaging – Cytomegalovirus infection – Infants – Intracerebral echogenicities

Introduction

Cytomegalovirus (CMV) infection of pregnant women often causes severe clinical changes in fetuses including cerebral calcifications.

Recent neuropathological studies showed that intracerebral echogenicities in newborns with congenital CMV-, rubella- and syphilis-induced infection are caused by a vasculitis with mineralised deposits in arterial walls and perivascular infiltrations of mononuclear cells [8].

Colour-coded Doppler imaging (CDI) allows simultaneous display of flow within the grey scale ultrasound image [2]. By simultaneous imaging of brain tissue and flow within the intracranial arteries using CDI, the relationship between pathological structures such as echogenicities and the intracerebral vessels can be demonstrated.

Patients and methods

Two children with congenital CMV infection were studied by CDI with a computer sonographic unit (Acuson

128, Mountain View, California, USA) with a 5 MHz transducer. Flow towards the transducer was displayed red, flow away from the transducer was displayed blue.

Sagittal and coronal brain sections were performed using the open fontanelle as an acoustic window.

Patient 1

The patient was born in the 35th gestational week by caesarian section because of uteroplacental insufficiency. Birth weight was 1300 g. Clinical manifestations included hepatosplenomegaly, thrombocytopenia with petechiae, anaemia, leukopenia, convulsions, microcephaly, and chorioretinitis. Serum CMV-specific IgM antibodies were negative, IgG antibodies were positive. The diagnosis of CMV infection was established by repeated isolation of the virus from the infant's urine. Cerebral ultrasound showed mild ventriculomegaly and stripe-like echogenicities in the region of the basal ganglia. CDI demonstrated flow within the echogenicities. It was assumed that the echogenicities were localised in the vessel walls of the thalamostriate vein and artery (Fig. 1a–c).

Patient 2

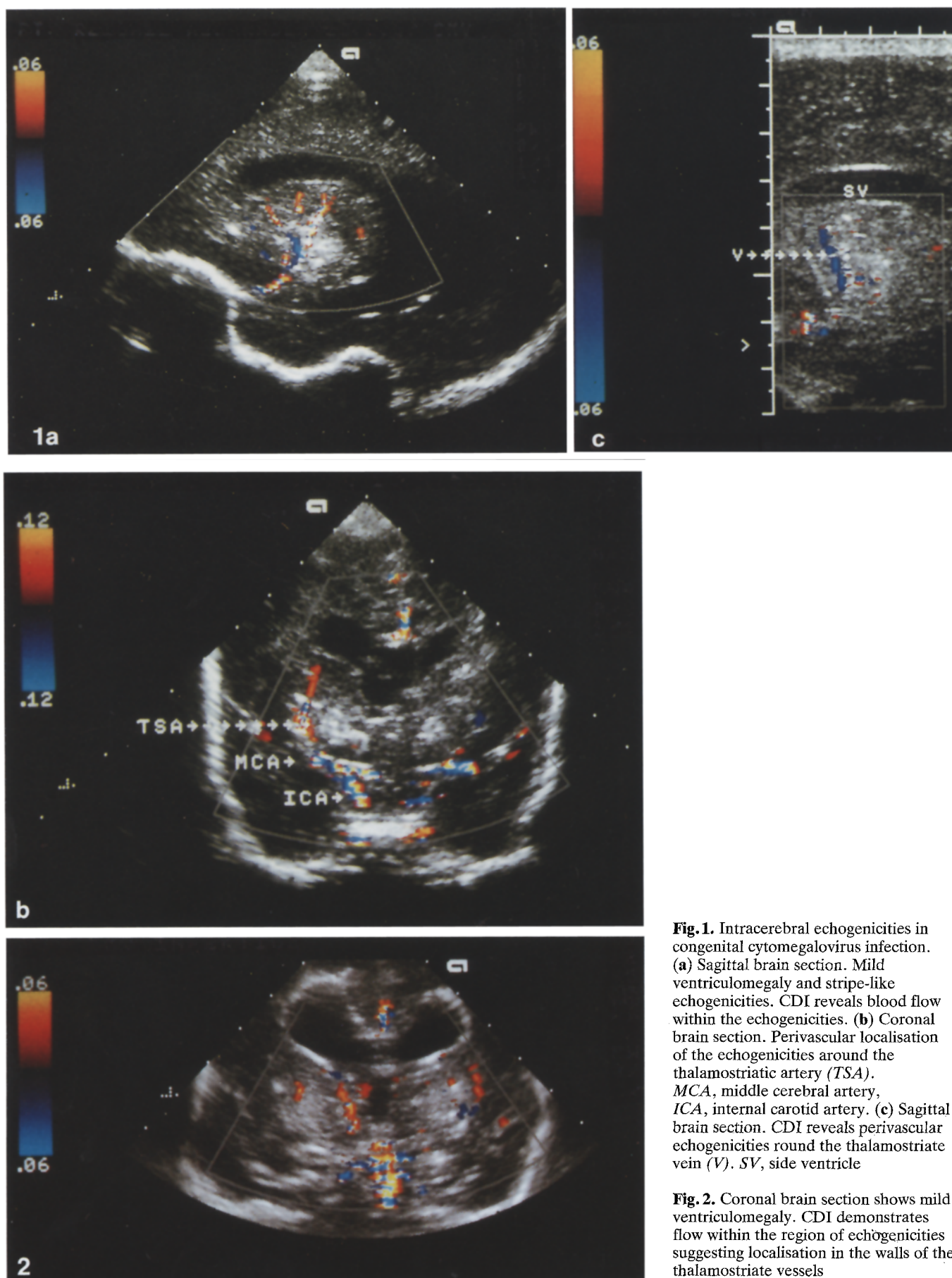
This patient was born in the 38th gestational week weighing 2410 g. Clinical manifestations included microcephaly, chorioretinitis and convulsions. Both IgM- and IgG-specific antibodies to CMV were positive and CMV was isolated from the urine. Cerebral ultrasound showed moderate ventriculomegaly with periventricular echogenicities and spot-like echogenicities in the basal ganglia. CDI revealed flow in the region of the echogenicities suggesting localisation in the walls of the thalamostriate vessels (Fig. 2).

Discussion

Intracranial echogenicities in newborns can be found after prenatal infections, mostly due to toxoplasmosis and CMV. The echogenicities in CMV infection are usu-

Offprint requests to: M. Ries

Abbreviations: CDI = colour Doppler imaging; CMV = cytomegalovirus



ally periventricular and in the region of the basal ganglia [3, 8]. The latter often have a stripe-like appearance. Histological studies have shown that the echogenicities of the basal ganglia in prenatal CMV infection are caused by non-calcified deposits of amorphous basophilic material in the walls of the vessels and are pathognomonic for vasculopathy [8]. These authors suggested that the perivascular inflammatory infiltrates provoke mineralisation and calcification.

Acute vasculitis in CMV infection has been described in the central nervous system [5], colonic wall [4], muscle [1] and in the skin [7]. CDI allows simultaneous display of flow within the grey scale ultrasound image. In our patients CDI showed flow within intracerebral echogenicities which were probably the sequelae of CMV-associated vasculitis. This method can also be used in the diagnosis of other forms of vasculopathy, e.g. in prenatal toxoplasmosis-, rubella- and syphilis-induced infection.

In 1987 Patel [6] reported on intracranial calcifications in children with tuberous sclerosis, osteopetrosis, tuberculoma and Sturge-Weber syndrome. It would be of interest to examine those children by CDI to determine whether a relationship exists between the calcifications and the intracerebral vessels in the early stage of these diseases.

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