

Neuroradiological Findings Related to Zika Epidemic: Experience from a Brazilian University Hospital

Wednesday 12:45-1:15 PM | NR394-SD-WEB2 | NR Community, Learning Center Station #2

PURPOSE

Present the imaging aspects in the three target groups affected by Zika virus infection, as follows: adults who developed acute neurological syndrome, newborns with vertical infection with neurological disorders and pregnant woman who presented suggestive exanthematic fever syndrome by Zika.

METHOD AND MATERIALS

Since January 2016 we received patients with exanthematic fever suggesting Zika to perform imaging exams, and we divided these patients, as described. Neural axis MRI were performed in adult patients with acute neurological syndrome after exanthematic fever suggestive of Zika infection. Newborns with microcephaly whose mothers had exanthematic fever underwent brain MRI, some also with US and CT, and histopathological study of the placenta. Fetal MRI was performed in pregnant women who have had exanthematic fever. There is a limited ability for laboratory confirmation of Zika in the locations affected by the epidemic, so that exanthematic fever was considered as a marker for infection. Patients were scanned with a 1,5T MRI, and in adults using a protocol with pre and post contrast acquisitions.

RESULTS

Most adult patients presented with symptoms of Guillain-Barré syndrome and variants, a few patients presented with encephalomyelitis. The most common finding was lumbar root enhancement followed by lumbar dorsal ganglia enhancement and facial nerve enhancement. Other findings included brain stem lesions with high T2/FLAIR signal, spinal cord lesions with high T2/FLAIR signal, and trigeminal nerve enhancement. We found good correlation of symptoms and imaging findings. In newborns MRI and fetal MRI showed anatomical changes in the brain parenchyma and orbital injuries.

CONCLUSION

MRI was used in clinical investigation of adult patients, excluding other common diseases in this age group, helping in the different diagnosis, given the limited availability of specific serologic test for Zika in Brazil. We observed acute neurological syndromes related to Zika, such as Guillain-Barré syndrome and Miller Fisher variant, Bickerstaff syndrome, and encephalomyelitis. In newborns and fetuses anatomical changes can be related to gestational age which pregnant had the exanthematic fever.

CLINICAL RELEVANCE/APPLICATION

MRI is a sensitive tool for demonstrating signs of Guillain-Barré syndrome and encephalomyelitis associated with Zika virus. In newborns and fetuses, MRI helped us understand the injuries that occur in the developing brain, as other TORCH.

Essentials of Intrauterine Zika Virus Infection: Pre and Postnatal CNS Findings

Wednesday 12:15-12:45 PM | PD232-SD-WEA3 | PD Community, Learning Center Station #3

PURPOSE

Zika virus (ZIKV) belongs to the family of flavivirus and as for dengue and chikungunya infections may be recognized *Ae. Aegypti* and *Ae. Albopictus* mosquitoes as transmission agents. This virus has tropism for the central nervous system (CNS) and has been strongly associated with common findings to congenital infections, with some features which are described in this presentation.

METHOD AND MATERIALS

We performed a prospective study with seven pregnant patients with ZIKV infection at different gestational ages. They were subjected to ultrasound and fetal MRI. After birth, the newborns performed transfontanellar US, CT and MRI of the head, with posterior 3D reconstructions of the skull. We compared the cases with and without CNS involvement in the patients with intrauterine ZIKV infection. We quantified and illustrated the most frequent findings in the patients who had changes in their CNS. The main findings of CNS abnormalities were reported and several specific findings were displayed on a chart, including microcephaly, and submitted to statistical analysis.

RESULTS

From the 7 cases of ZIKV infection, 4 showed brain abnormalities with microcephaly. Multiple calcifications with cortical and mainly subcortical distribution were seen in all of these 4 cases. Significant thinning of the brain parenchyma, which have extensive periventricular areas of hyperintensity on T2 MR-WI were reported in all of the 4 cases. Neuronal migration anomalies were reported in 3 cases. Dysgenesis of the corpus callosum and ventricular enlargement secondary to cortical/subcortical atrophy were also detected in all of these 4 cases. The cerebellum was affected only in 1 case. Brain stem was not affected on these 7 cases.

CONCLUSION

Microcephaly with almost complete agyria, hydrocephalus, and multifocal dystrophic calcifications in the cortex and subcortical white matter, with associated cortical displacement were the main findings on intrauterine ZIKV infection with CNS involvement.

CLINICAL RELEVANCE/APPLICATION

Brain calcifications detected prenatally was a finding suspicious with a intrauterine infection. Moreover, perinatal imaging by MRI and CT scan enabled diagnosis of pachygyria, corpus callosum dysgenesis, small anterior fontanel with premature closure of cranial sutures. All of these aspects are seen in the majority of the intrauterine ZIKV infection with CNS involvement and it can be considered on diagnosis criteria.

Common Findings on Head Computed Tomography in Neonates with Confirmed Congenital Zika Syndrome

Sunday 12:30-1:00 PM | PD200-SD-SUA1 | PD Community, Learning Center Station #1

PURPOSE

Describe central nervous system (CNS) computed tomography (CT) findings in neonates with congenital microcephaly associated with the presence of Zika virus in cerebral spinal fluid.

METHOD AND MATERIALS

A series of 14 newborns with congenital microcephaly who exhibited abnormality findings on brain CT without contrast as part of the protocol established by the health ministry during outbreak of Zika, from October to December 2015. These infants had negative IgM serology for toxoplasmosis, rubella, cytomegalovirus and syphilis, and IgM negative for dengue virus and positive for ZIKA virus by ELISA in the CSF. All CT scans were performed in multislice CT scanner and analyzed by the same radiologist.

RESULTS

We reported findings of cranial CT of 14 newborns, 9 male and 5 female. Gestational age ranged from 31 to 40, weight at birth from 810 to 3.840 grams and head circumference from 23 to 33 centimeters. Calcification in the central nervous system (CNS) were seen in all patients, being punctiform in 8 (57.1%) and coarsely in 6 (42.8%). 13 neonates (92.8%) showed calcification in the cortico-medullary junction, 3 (21.4%) in thalamus and 1 (7.1%) in midbrain. The cortico-medullary junction calcifications were located mainly at frontal (92.8%) and parietal lobes (78.5%) and less often at occipital (35.7%) and temporal lobes (28.5%). Global hypogyration of the cerebral cortex was seen in 11 (78.5%) infants. In 13 (92.8%) neonates ventriculomegaly was present. Cerebellar hypoplasia was seen in 4 patients (28.5%). Prominent occipital bone was identified in 9 patients (64.2%), which can be associated with fetal brain disruption sequence, characterized by severe microcephaly, overlapping sutures, scalp rugae and marked neurological impairment, reflecting important intrauterine brain damage.

CONCLUSION

There is a pattern of tomographic findings in central nervous system of neonates with microcephaly and Zika virus infection. Although the etiopathogenesis and associated risk factors have not yet been well established these data strongly suggest that Zika virus can cause microcephaly.

CLINICAL RELEVANCE/APPLICATION

There is a pattern of tomographic findings in central nervous system associated with the microcephaly outbreak that suggest a new etiology. In face of the increase of microcephaly cases, and the possibility of global dissemination of Zika virus, it's necessary to recognize these radiologic findings.