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YF, but analysis of milk was not carried out.[10] In this report, the infant had encephalitis, with several seizures, but recovered without sequelae. However, due to the severity of the condition and the possibility of transmission by milk, the Ministry of Health recommended careful assessment of epidemiologic risk regarding the use of the YF vaccine in breastfeeding women.[10]

This is the first report of CHIKV RNA particles in breast milk and for an extended period of more than 3 weeks without transmission to the baby. There are few other reports on the detection of arboviruses in maternal milk as described above. Even though CHIKV can be found in the milk, in the absence of cytopathic and replication in Vero cell of the isolate, we must be very cautious before affirming CHIKV infection could be transmitted by breast milk and cross infant natural barriers to cause a significant disease. The detection of CHIKV in breast milk raises clinical and epidemiologic questions and more studies are needed to assess its potential of infectivity.

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RAISED FREQUENCY OF MICROCEPHALY RELATED TO ZIKA VIRUS INFECTION IN TWO BIRTH DEFECTS SURVEILLANCE SYSTEMS IN BOGOTÁ AND CALI, COLOMBIA

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Zika virus infection during pregnancy is now known to cause congenital microcephaly and severe brain defects. In 2016, rates of microcephaly appeared to start increasing around May, peaking in July, and declining through December. The occurrence of microcephaly appears to have increased nearly 4-fold in 2 large cities in Colombia, concurrently with the reported Zika virus epidemic in the country.

Key Words: central nervous system malformations, zika virus, microcephaly

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Zika virus infection during pregnancy is now known to cause congenital microcephaly and severe brain defects.[1] In Brazil, epidemiologic studies in Brazil have documented a remarkable increase in population rates of microcephaly concurrent with the epidemic.[2,3] Colombia has been experiencing an epidemic wave of Zika infection, starting approximately in October 2015. However, epidemiologic data on central nervous system (CNS) anomalies in the country have been limited. Here, we document the trends of microcephaly and severe CNS malformations in 2 major cities in Colombia from 2012 through 2016, tracking the epidemiologic curve from before through the major Zika epidemic so far. We used data from 2 birth defect surveillance programs,[4] which are part of international surveillance networks (ECLAMC: Latin American Collaborative Study of Congenital Malformations and the International Clearinghouse for Birth Defects Surveillance and Research).

MATERIALS AND METHODS

Congenital Anomalies

Microcephaly was defined as an occipitofrontal circumference <3rd centile at birth, for gestational age and sex. This definition has not changed since inception of the surveillance programs (2001 and 2010). The study also included neural tube defects (anencephaly, spina bifida and encephalocele), holoprosencephaly and hydrocephaly. Malformations were reported by clinicians at the source hospitals and coded using World Health Organization International Classification of Diseases codes, 10th revision.

Surveillance Programs

The data were derived from 2 hospital-based surveillance programs in 2 large cities in Colombia, Bogota' and Cali. The Bogota' program, started in 2001, includes 51 hospitals. The Cali program, started in 2010, includes 2 hospitals that cover 25.9% of all city births. Together, the 2 programs monitor approximately 110,000 births per year.

These surveillance program monitor selected major congenital anomalies (reference) among all pregnancy outcomes, including live births and stillbirths (fetal deaths, ≥500 g in weight).

Data

Prevalence was calculated as cases of anomalies ascertained among live births, stillbirths and pregnancy terminations, divided by the number of live births and stillbirths for the same period. The study period was from January 2012 through December 2016.

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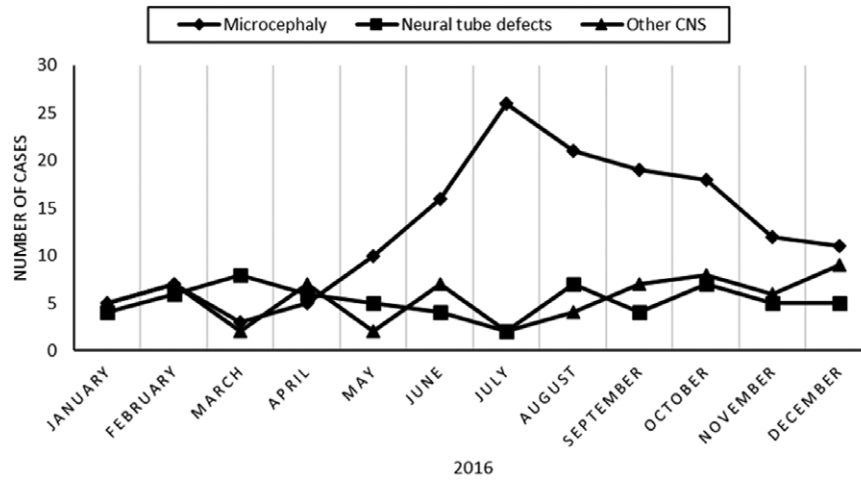

FIGURE 1. The tendency of microcephaly compared with neural tube defects (anencephaly–encephalocele–holoprosencephaly–spina bifida) and other CNS malformations (hydrocephalus) in 2016.

RESULTS

Results are illustrated in Figure 1, with additional data in Table, Supplemental Digital Content 1, http://links.lww.com/INF/C755. Briefly, in 2016, rates of microcephaly increased nearly 4-fold within months of the reported Zika infection epidemic in Colombia. The prevalence of neural tube defects was unchanged from the prior year and within the expected variability for birth cohort size. In 2016, rates of microcephaly appeared to start increasing around May (8 months after the reported start of the Zika virus epidemic), peaking in July, and declining through December 2016 to levels close to those reported in May 2016.

The prevalence of microcephaly in 2016 was 11.6 per 10,000, a net increase of 8.5 cases per 10,000 births compared with the average prevalence in the prior 4 years (3.06 per 10,000).

If these estimates are generalizable to the 2016 birth cohort in the cities of Cali and Bogota, then 121 cases of severe microcephaly associated with Zika virus epidemic would be expected in both cities and 588 cases in Colombia for 2016.

Using data generated from 2 birth defect surveillance programs operating since several years before the Zika epidemic, we documented the sharp rise of microcephaly concurrent with the expected epidemic curve of Zika-related congenital anomalies. The increase in microcephaly rates began approximately 7–9 months after the reported infection outbreak in Colombia, consistent with a teratogenic effect mostly concentrated in early pregnancy. Notably, the epidemic of microcephaly seemed to have peaked in July 2016, followed by a fairly rapid and consistent decline through December 2015, consistent with possibly a single epidemic wave of infection.

Overall, the epidemic curve of microcephaly in this study is similar to that observed in the Brazilian state of Pernambuco.[5] In previous reports from Colombia, 4 infants with microcephaly, born between January and April 2016, had laboratory evidence of congenital Zika virus infection on Real time reverse transcriptase polymerase chain reaction (RT-PCR) assay, a negative STORCH (Syphilis, Toxoplasmosis, Rubella, Cytomegalovirus, Herpes simplex and HIV) evaluation, and normal karyotypes.[6,7] That result can be explained by the Zika virus infection.

Rates of microcephaly in this study are relatively higher at baseline than what was reported in other countries. For example, EUROCAT (European surveillance of congenital anomalies) programs (in areas not expected to be a major target of the Zika epidemic) reported an overall prevalence of 1.53 per 10,000 (2003 through 2012).[8] The Latin American Collaborative Study of Congenital Malformations (ECLAMC) in South America reported rates of 0.7 per 10,000,[9] probably a underestimate, whereas the Argentina national program reported a rate of 2.4 per 10,000 before 2014.[5]

The trends for other major CNS malformations were less clear and require further assessment. The findings could possibly relate in part to increased awareness and reporting of congenital anomalies. However, the definition of microcephaly was quite specific (<3 standard deviations), and increased awareness would not explain the rapid decline in reporting after the peak of the epidemic.

CONCLUSIONS

The occurrence of microcephaly appears to have increased nearly 4-fold in 2 large cities in Colombia, concurrently with the reported Zika virus epidemic in the country. For other major CNS anomalies, the evidence is less clear, and further studies are indicated. If the relation with the Zika virus epidemic is causal, the net increase in severe microcephaly has been in the order of 8.5 new cases attributable to Zika infection per 10,000 births. This cohort of affected children will require follow-up and significant healthcare resources over time. This study also highlights the value of having birth defect surveillance program in place, to quickly generate a pre-epidemic baseline and assess the impact of new teratogens. Expanding surveillance beyond birth prevalence to describing clinical outcomes (eg, survival, morbidity and disability) will enhance the usefulness of these programs in promoting and evaluating care to improve the quality of life of patients.

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