Early diagnosis of maternal cytomegalovirus for improved management and reduced risk of fetal transmission and complications

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Babies born with a cytomegalovirus (CMV) infection or congenital cytomegalovirus can be at higher risk for serious complications. Congenital CMV is the leading cause of non-genetic hearing loss and neurodevelopmental disabilities in children. Despite this, congenital CMV is often under-recognized by many health authorities and remains relatively unknown to the public.

For these reasons, an integrated care team at the National Reference Center for Herpesvirus at the University Hospital Center in Limoges, France, sought to change the paradigm through adoption of a universal CMV screening program for pregnant mothers. The aim was to improve early diagnosis of CMV infections and identify those mothers with non-primary infections.

Dr. Perrine Coste-Mazeau, Professor Sebastien Hantz and Professor Sophie Alain of University Hospital Center Limoges.

"It's important to be informed about the implications of the cytomegalovirus and to identify women at risk of primary infection," said Dr. Sebastien Hantz, MD, PhD, a physician with the National Reference Center for Herpesvirus, who led the initiative that won a 2022 award of distinction for the UNIVANTS of Healthcare Excellence awards program.

"That way, we can screen the baby for congenital CMV infection in order to put measures in place to treat the infected newborn and to limit the development of abnormalities and developmental delays," Hantz added.

CMV occurrence and transmission rates

About one out of every 200 infants is born with congenital CMV infection and around 20% of babies born with it will have long-term health problems, according to the Centers for Disease Control and Infection.

Primary infection during the first trimester poses the greatest risk of complications to the fetus.

According to the CDC, a pregnant woman can pass CMV to her fetus following primary infection, reinfection with a different CMV strain, or reactivation (secondary infection) of a previous infection during pregnancy. Risk of transmission for primary infection is 30% to 40% (about 1 in 3) in the first and second trimesters, and 40% to 70% in the third trimester. The risk of transmission following secondary infection is much lower at 3%.

In France, about 50% of the population is infected with CMV, according to Hantz, and "if a woman is infected during pregnancy, in about 40% of cases the virus can cross the placenta and be transmitted to the fetus," he said.

Challenges of identifying CMV infection

Congenital cytomegalovirus can be challenging to identify in newborns, since an estimated 90% of babies born with it do not present with immediate symptoms. Some babies with congenital CMV will not have any health impairments or visible developmental delays, while others may experience hearing loss, vision loss, microcephaly, or enlarged spleens and livers. In rare cases, the condition is fatal.

There is currently no standard for universal CMV screening during pregnancy and screening in not recommended in many countries. Due to the lack of screening in newborns, the prevalence of CMV and its impact are likely higher than is currently estimated, Hantz shared.

Outcomes of early diagnosis of CMV

Since inception of the universal screening program in 2020 at the National Reference Center for Herpesvirus, there has been a 2.6-fold increase in the number of pregnant women identified with a CMV infection (from 10 to 26 CMV-positive expectant moms over 2.5 years).

Adoption of the screening program facilitated earlier neonatal intervention by initiating antiviral treatment in 68% of eligible CMV-positive mothers during the first trimester of pregnancy.

Due to this earlier intervention, there was a 23% reduction (from 50% to 27%) in congenital CMV transmission from diagnosed CMV-positive mothers to their babies. This translated to cost avoidance of nearly $810,000 per affected child by reducing the congenital CMV progression and mitigating long-term health problems, such as vision loss, hearing loss and intellectual disabilities.

"We have shown that treatment of symptomatic newborns can decrease developmental delays," Hantz said. "That is our ultimate goal."