Arthritis drug answer to pregnancy malaria, study finds

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Babies with low birth weight are one of the aftermaths from placental malaria. Credit: OPS/Flickr [CC BY-NC 2.0]

Babies exposed to malaria in the womb can suffer low birth weight and miscarriages, but a new study has found a common arthritis drug could put an end to the scourge of placental malaria.

Maternal malaria is a serious health risk to both mothers and babies, particularly in endemic parts of the global South. Classified by the World Health Organization as a significant public health threat, some studies estimate maternal malaria causes up to 200,000 infant deaths each year in sub-Saharan Africa alone.

The placenta provides an immunologic barrier against infection that protects the fetus and ensures its proper development. Placental malaria can cause severe inflammation that leads to abortion and preterm delivery, and restricts fetal growth.

"Placental malaria occurs when the parasite manages to get into the placenta. It triggers an inflammatory response from the immunological system that ends up deregulating the exchange of nutrients between the mother and the fetus," says Silvia Beatriz Boscardin, a biologist at the University of São Paulo's Biomedical Science Institute.

The new study, published in *Science Advances*, found that the drug Anakinra restored fetal growth and reduced deaths in an experimental model. Anakinra is commonly used to treat rheumatoid arthritis and used as an off-label therapy for various other conditions, such as gout and Schnitzler's syndrome.

Last year, Johns Hopkins Medicine researchers reported they had successfully used Anakinra to reduce fetal deaths and birth defects in pregnant mice with Zika virus, while scientists in the United Kingdom found the drug may help prevent breast cancer spreading to the bone, where it is incurable.

The Brazilian study followed 600 pregnant women across two years in the state of Acre, in the north of the country. The region is highly affected by different species of Plasmodium, the parasite that causes malaria, including P. falciparum, the most virulent species responsible for the greatest placental damage.

Pregnant rodents used in the study presented similar problems to pregnant women infected by P. falciparum, such as low embryo survival. "The inflammation affected the intrauterine space and changed the physiology of the placenta," lead author Cláudio Marinho tells

SciDev.Net.

"The findings are important because they have shown that an already existing drug, approved for use in humans, is able to block [the proten] Interleukin 1 beta signaling, and prevent the deregulation of nutrient transporters," says Boscardin, who did not participate in the study.

Ricardo Tostes Gazzinelli, a biochemist at the Oswaldo Cruz Foundation in Minas Gerais, tells SciDev.Net that the inflammatory process that takes place in the placenta of women affected by malaria during pregnancy "was not well understood," which hindered new treatment development.

"The study by Marinho has elucidated this mechanism and has also shown that a commonly used drug may support the treatment for pregnant women with malaria," Gazzinelli says. "It means that other anti-inflammatory drugs could be used in the same way."

Results from the first clinical trial of a malaria vaccine safe for pregnant women were published last month.

More information: Aramys S. Reis et al. Inflammasome activation and IL-1 signaling during placental malaria induce poor pregnancy outcomes, *Science Advances* (2020). DOI: 10.1126/sciadv.aax6346

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