RELATIONSHIPS BETWEEN PRENATAL MALARIA EXPOSURE, INNATE IMMUNE RESPONSES AT BIRTH AND THE RISK OF MALARIA DURING THE FIRST YEAR OF LIFE

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Background

There is large body of evidence indicating that placental malaria is an important risk factor for newborn's susceptibility to malaria in early infancy. However it is still poorly understood how maternal infections modulate infant's innate immune system to modify infant's risk to infection. The aim of the current study was to investigate relationships between prenatal malaria exposure, innate immune responses at birth and the risk of malaria during the first year of life.

Methods

As part of a clinical trial on malaria preventive treatment during pregnancy, we conducted a birth cohort study including 313 mother-child pairs. Malaria infections during pregnancy were recorded and clinical episodes detected during the first year of life among infants. Prenatal malaria exposures were categorized based on placenta histology as follows: infants born from mothers (i) with active (acute and chronic) placental infection (N=45), (ii) with past placental infection (N=185), (iii) with peripheral infection during pregnancy but with no placental infection at delivery (N=61) and (iv) with no peripheral infection during pregnancy and no placental infection at delivery (N=22). TLRs (3, 7/8 and 9)- induced cytokines/chemokines/growth factors released by cord blood mononuclear cells were performed using whole cord blood samples. All the analytes levels were determined using a fluorescent bead-based multiplex immunoassay (Human Cytokine Magnetic 30-Plex Panel kits, Novex®, Life Technologies™, USA) and samples were acquired on a Luminex® 100/200™ instrument using Xponent 3.1 software. Median fluorescent intensity (MFI) data was analyzed using the drLumi 0.1.2 R package in which concentration of each analyte was determined by extrapolating the MFI to a standard curve of 2-fold 16 serial dilutions prepared from a reference sample provided by the manufacturer. Then the effect of types of prenatal malaria exposures on TLRs- induced cytokines /chemokines/growth factors at birth and subsequent risk of malaria during the first year of life was investigated.

Preliminary results

Preliminary results showed that levels of some cytokines/chemokines/growth factors induced by TLRs agonists are significantly modified by different types of prenatal malaria exposure. Among these, some cytokines/chemokines/growth factors also showed significant association with clinical malaria occurrence during the first year of life.

Conclusion

These preliminary results indicate that both peripheral infection during pregnancy and placental infections at delivery have an effect on innate immune responses of the newborn at birth, which can influence their susceptibility to malaria during the first year of life.