Detection of *Orientia tsutsugamushi* Infection from Stillbirth Cases: Finding from CHAMPS Study in Bangladesh

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**Background**

*Orientia tsutsugamushi* is a mite-born obligate intracellular gram-negative bacterium known to cause scrub typhus, a febrile illness endemic in the Asia-Pacific region. The infection is treatable with doxycline. During pregnancy *O. tsutsugamushi* could lead to

- Stillbirth,
- Prematurity
- Low birth weight

Bangladesh falls within the Tsutsugamushi triangle where scrub typhus is endemic. Information of scrub typhus on pregnancy outcome due to *O. tsutsugamushi* infection is unknown from this region. From Child Health and Mortality Prevention Surveillance (CHAMPS) project data we report three stillbirths from rural Bangladesh where *O. tsutsugamushi* was identified using molecular methods.

**Methods**

The CHAMPS Project implemented minimally invasive tissue sampling (MITS) technique to collect specimens from post-mortem stillbirths and under-5 deaths. Specimens were tested using histopathology, microbial culture and syndrome based Taqman array card (TAC) platform (Fig. 1). Primers for *O. tsutsugamushi* is included in both blood and CSF TAC cards. The laboratory findings along with maternal clinical history, demographic data and verbal autopsy is shared with a panel of experts (DeCoDe panel) to determine the cause of death.

**Results**

*O. tsutsugamushi* DNA was detected from the postmortem stillbirth specimens From August 2017 to Aug 2021 specimens from 115 stillbirths were collected. Among the cases, *O. tsutsugamushi* was identified from 3 cases (2%). All three stillbirths were preterm, macerated, low birth weight and detected before delivery by ultrasound or lack of fetal movement (Table -1).

**Pathway of *Orientia tsutsugamushi* mediated stillbirth**

**Figure 1.** The brief data acquisition protocol for CHAMPS

**Figure 2.** Summary of maternal complications during pregnancy. Maternal complications include feverish, acidity, burning sensation, blurred vision, restlessness, lower abdominal pain etc.

**Conclusions**

*O. tsutsugamushi* was not considered in the causal chain of these stillbirth (Table 2).

**Table 1: Overall findings of the stillbirth cases. (*)& level of maceration was 1 (low =1, extreme = 3)

**Table 2: Cause of stillbirths from cases identified with *O. tsutsugamushi*/

**Figure 2.** Summary of maternal complications during pregnancy. Maternal complications include feverish, acidity, burning sensation, blurred vision, restlessness, lower abdominal pain etc.

**Cause of stillbirth**

Intrauterine hypoxia was identified as underlying cause of stillbirth for two cases. For Case 2 Cytomegalovirus (CMV) was identified from Blood, CSF and Lung using TAC resulting in intrauterine CMV infection as cause of stillbirth. *O. tsutsugamushi* was not considered in the causal chain of these stillbirth (Table 2).

**Table 2: Cause of stillbirths from cases identified with *O. tsutsugamushi*/

**Conclusions**

*O. tsutsugamushi* was not considered in the causal chain of stillbirth due to lack of maternal laboratory diagnosis, high Ct value in TAC and no previous report on scrub typhus mediated stillbirths in Bangladesh. Ct values were consistent with adult diagnosis cases. Possibility of contamination is unlikely and other acute febrile illness studies identifying *O. tsutsugamushi* in Bangladesh detect high Ct value. Therefore, The real burden and impact of scrub typhus infection among pregnant women in Bangladesh deserves further investigation.