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A Review on Pregnancy with Cholera and its Effects on Health

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Abstract

Examining the clinical and immunological aspects of cholera in pregnancy was the study's main goal. Pregnancy tests were conducted on women of reproductive age who presented to the ICDDR, Bangladesh Dhaka hospital with cholera and were enrolled in a broader cohort study. At days 2, 7, and 21 following infection, we compared the first clinical characteristics and immunological responses of pregnant patients with those of non-pregnant female patients. To our experience, this is the first account of immunological responses in cholera-infected pregnant women. When compared to non-pregnant women, we discovered that early in pregnancy, clinical sickness and subsequent immunological responses are similar in pregnant women. These results imply that next research should focus on assessing the immunogenicity and safety of oral cholera vaccinations during pregnancy.

Keywords: Pregnant; Patients; Clinical Sickness

Introduction

The diarrheal illness cholera, which can be fatal, is primarily brought on by infection with *Vibrio cholerae* O1. Cholera is a disease that, while uncommon in affluent nations, is common in many parts of South and Southeast Asia, Africa, and has the potential to spread widely. Cholera is an endemic disease that pervades Bangladesh, a country in South Asia, all year round in high-risk locations. The major toxin generated by *V. cholerae* O1 and O139, Cholera Toxin (CT), produces an excess release of electrolytes and water, which can occasionally be lethal. The major antigen in the most current formulations of the oral cholera vaccine is the lipopolysaccharide of *V. cholerae*, which is a Crucial Predictor of Protection (OCV). The immune system is altered during pregnancy, and both cellular and humoral immunity are impacted. Anomalies in immunological responses during pregnancy have been associated to a number of pregnancy outcomes, such as hypertension, poor foetal growth, and preterm birth. Additionally, in both human and animal models, pregnancy has been linked to both increased anti-inflammatory and decreased inflammatory responses to immunological challenges. Pregnant women can occasionally be more prone to specific illnesses, which can result in more severe disease when contracted. For instance, compared to other groups, pregnant women with influenza virus infection are at higher risk for serious consequences, despite the fact that a recent study on the influenza virus vaccine during pregnancy found that pregnancy did not significantly affect antibody responses. Studies from South Asia, Africa, and Haiti have shown that cholera during pregnancy may raise the likelihood of poor outcomes. Women who live in cholera-endemic areas are at risk of contracting the illness during pregnancy. To ascertain if immunization would be useful in prophylaxis, data on the immunological reactions to cholera during pregnancy are lacking. Therefore, the goal of this study was to investigate the clinical traits and immunological reactions of pregnant women who had recently experienced severe cholera [1, 2].

Population and Patient

The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B) and Massachusetts General Hospital in Boston joined forces to conduct the prospective, observational Cholera Immune Response Study (CIRS). Every year, about 120,000 patients with diarrheal diseases are treated at the ICDDR, B in Dhaka, Bangladesh. Patients were prospectively enrolled in the study between 2001 and 2006 after presenting to the icddr,b Dhaka hospital with acute watery diarrhoea (study day 1). If their stool cultures later tested positive for *V. cholerae* and they were free of significant co-morbid conditions, they were eligible to participate in the study. On taurocholate-tellurite-gelatin agar, *V. cholerae* stool cultures were performed. Serological confirmation of suspected *V. cholerae* colonies was performed by slide agglutination after overnight plate incubation. By using a urine strip test (hCG One Step Pregnancy Test Strip, TUV Product Service, USA), all women of reproductive age (15-49) who signed up for the CIRS study were initially checked for pregnancy. Pregnancy tests came back positive for a total of 14 women. We also chose all of the non-pregnant cases from the same age cohort to serve as controls [3, 4].

Care for Patients

The standard of care for treating cholera at the ICDDR, B was given to study participants. Depending on the patient's clinical condition and the severity of the dehydration, either intravenous cholera saline or an oral rehydration solution was used to treat the condition. Oral antibiotics were prescribed for a brief period of time. Adult females who were not pregnant and whose stool samples tested positive for *V. cholerae* were given 300 mg of doxycycline in a single dose, while pregnant women who had the disease were given erythromycin (500 mg every six hours) for three days. Using the target microorganisms *V. cholerae* O1 El Tor Ogawa (strain X25049), Inaba (strain 19479), or *V. cholerae* O139 (strain 4260B) and guinea pig complement, we assessed vibriocidal antibodies in patient plasma. 16 A kinetic Enzyme-Linked Immuno Sorbent Assay (ELISA) was used to measure the antibody responses to recombinant Cholera Toxin B Subunit (CtxB), Toxin-Coregulated Pilus A Subunit (TCPA), and Lipo Poly Saccharide (LPS), as previously described. In each case, the patient's serotype of *Vibrio cholerae* O1 and O139-Ogawa or Inaba-was used to measure the vibriocidal and LPS responses [5].

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Discussion

This is the first study we are aware of on the immune reactions in pregnant women who have had cholera. Overall, we discovered that severe cholera patients from both pregnant and non-pregnant women presented to the ICDDR, B hospital with similar clinical and immunological characteristics. The vibriocidal antibody responses following infection with *V. cholerae* O1 were generally more robust than those seen following infection with *V. cholerae* O139, as we have previously observed when patients infected with O1 versus O139 were analysed separately. Between pregnant and non-pregnant women infected with *V. cholerae* O1, serum vibriocidal responses and antibody responses to LPS, CtxB, and TcpA were comparable. Compared to non-pregnant women who were also infected with this serogroup of *V. cholerae*, pregnant women showed lower blood levels of vibriocidal responses and antibody responses to LPS and CtxB. During the 21 days of follow-up for the pregnant cases, neither the cases nor the controls who were not pregnant experienced any fatalities or negative effects on the foetus, according to this study. The pregnant women who were infected were in their first or second trimester, and our follow-up period was only 21 days after infection [6-8].

The severity of dehydration was the primary predictor of foetal death in a previously non-endemic region, according to analysis of outcome data from a large cohort of pregnant women with cholera. There was no difference in the severity of dehydration between pregnant and non-pregnant women presenting in the first or second trimester with severe cholera, even though our study did not follow the outcome of pregnancy for longer than the 21 day follow up period after the episode of cholera. At the ICDDR, B severe dehydration is treated with cholera saline as soon as a patient is admitted to the facility. Following adequate hydration and maintenance of ongoing fluid losses, the treatment of cholera patients entails fluid resuscitation based on the degree of dehydration. The antibacterial antibody response in cholera patients has been measured using the serum vibriocidal antibody assay, and it has been demonstrated that higher vibriocidal antibody levels are associated with cholera protection. As a result, serum vibriocidal antibody responses are now used as a stand-in indicator of the effectiveness of the cholera vaccination. Between pregnant and non-pregnant cholera patients infected with *V. cholerae* O1, the main currently circulating serogroup, serum vibriocidal responses in our study did not differ. The primary drawback of this study is that it only included patients with severe cholera who required hospitalization. The association between pregnancy and the full spectrum of disease severity cannot be determined in this study because many *V. cholerae* O1 infections do not result in severe infections. Another drawback of this study is the small sample size (14 pregnant cholera patients), the fact that we only tracked pregnancy outcomes up to 21 days after infection, and the absence of data on longer-term foetal outcomes. For some patients in this study, we did not use the antibody-secreting cell assay or the antibody-in-lymphocyte supernatant assay to evaluate mucosal immune responses. This may help to explain why the women in this study, unlike those in later studies, had similar clinical severity because the majority of the pregnant women were in the early stages of gestation (the average pregnancy lasted 14 weeks). The small sample size of pregnant women assessed for clinical severity, as well as the inclusion of only women with severe cholera, suggest that we did not have sufficient power for a full accounting of the severity of disease in pregnancy. Despite these limitations, to our knowledge, our study represents a unique analysis of immune responses to cholera during pregnancy [9].

Conclusion

Despite the immune changes brought on by pregnancy, our research has demonstrated that pregnant women with severe cholera caused by *V. cholerae* O1 respond immunologically similarly to non-pregnant women. Our findings support the notion that pregnant cholera patients can mount typical vibriocidal and other anti-*V. cholerae* immune responses. These findings imply that future research should focus on evaluating the immunogenicity and safety of oral cholera vaccines during pregnancy in order to take into account the use of oral killed cholera vaccine in pregnant women at risk for cholera [10].

Acknowledgement

None

Conflict of Interest

None

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