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Is there an association between trimethoprim-sulfamethoxazole use as prophylaxis and multi-drug resistant non-typhoidal salmonella? A secondary data analysis of antibiotic co-resistance surveillance data in South Africa - 2003-2005

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ABSTRACT

Introduction

Given the increasing prevalence of non-typhoidal salmonella in humans, especially as an opportunistic illness associated with HIV, enhanced surveillance for non-typhoidal salmonella (NTS), including screening for antibiotic resistance, is conducted annually in South Africa. We aimed to determine whether there is an association between trimethoprim-sulfamethoxazole (TMP-SMX) prophylaxis and multi-drug resistant NTS infection, to establish whether various factors modify the relationship between TMP-SMX resistance and invasive NTS infection, to examine whether these associations vary by province, and to quantify the resistance rates of NTS to a range of antibiotics.

Methods

This study was a secondary analysis of enhanced surveillance data on NTS collected between 2003 and 2005. We used descriptive methods to assess the prevalence of NTS by year, province and serotype, and to determine the prevalence of four MDR patterns. Univariate and multivariate regression models were used to investigate the relationships between TMP-SMX prophylaxis and MDR NTS. Univariate logistic regression was used to assess the relationship between invasive NTS and TMP-SMX resistance.

Results

TMP-SMX prophylaxis is associated with the ACKSSuT pattern (OR 1.91, 95% CI 1.14 – 3.19, p=0.0080) and the AKSSuT MDR pattern (OR 2.00, 95% CI 1.26 – 3.15, p=0.0015). Being on TMP-SMX prophylaxis is associated with an increased odds of having at least one of the four MDR patterns investigated (OR 1.43, 95% CI 1.00 – 2.04, p=0.0388). We also found high rates of resistance to all antibiotics tested except for ciprofloxacin and imipenem. The highest resistance rate was observed for sulfamethoxazole (>75.85%). *S. enterica* Isangi isolates showed the highest levels of resistance, with 94.43% having at least one MDR pattern. Other factors significantly associated with MDR NTS were ESBL production, prior treatment with antibiotics, HIV status and resistance to TMP-SMX.

Discussion and conclusions

Isolates from patients on TMP-SMX prophylaxis were associated with an increased odds of having the ACKSSuT and AKSSuT MDR patterns, not taking into account other explanatory factors. These associations did not remain significant when possible confounders were taken into account. Despite the threat of increased multi-drug resistance, TMP-SMX prophylaxis remains important in certain clinical settings.