Proceedings of the International Conference on Nursing and Health Sciences, Volume 5 No 1, January - June 2024
e-ISSN 2774 – 5104, Global Health Science Group
http://jurnal.globalhealthsciencegroup.com/index.php/PICNHS

ANAL SWAB EXAMINATION OF SALMONELLA IN TYPHOID PATIENTS AFTER ANTIBIOTICS TREATMENT

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ABSTRACT

Thypoid is an endemic infectious disease in several countries caused by Salmonella thypi and Salmonella parathypi bacteria. These bacteria can be found in the blood, feces and urine of sufferers. Ciprofloxacin, Amoxicillin, Chloramphenicol and Ceftriaxone are commonly prescribed antibiotics in the treatment of thypoid. A stool examination to find the bacteria that causes thypoid can be used to evaluate the success of treatment and the patient's recovery rate. S. thypi Ag Rapid Test is an easy and fast method to detect the presence of thypoid bacteria. Objective: This study aims to detect the presence of thypoid bacteria in the feces of patients who receive antibiotic treatment on days 5, 10 and 15. Method: It was an observation research with a cross sectional approach. Samples in the form of anal swabs from 36 thypoid fever patients were taken on days 5, 10 and 15 after receiving antibiotic treatment. The examination uses S. thypi Ag Rapid Test. Results: A total of 27.8% of the samples showed positive results on the 5th day of examination, 22.2% were positive on the 10th day of examination and 11.1% of the samples were positive on the 15th day of the examination regardless of the type of antibiotic given. Conclusion: There was a decrease in the number of positive samples from day 5 to day 15, indicating improvement or recovery in some samples.

Keywords: thypoid; salmonella; salmonella antigen rapid test

INTRODUCTION

Typhoid fever is an acute infectious disease of the digestive system caused by the bacteria Salmonella typhi or Salmonella paratyphi. Typhoid fever is a global infectious disease, especially in developing countries. Typhoid fever is transmitted through food or drinks contaminated by Salmonella typhi bacteria, in addition to this disease can be transmitted through direct contact with feces, urine or secretions of people with typhoid fever. Hygiene and sanitation are the main factors in its transmission (WHO, 2023; Meiring et al., 2023).The clinical manifestations of typhoid fever can vary from mild to severe symptoms. Classic clinical symptoms of typhoid fever include fever, malaise, abdominal pain and constipation. Clinical symptoms caused by Salmonella paratyphi bacteria are generally milder than those caused by Salmonella typhi bacteria (Basnyat, 2021). Establishing the diagnosis as early as possible will be beneficial for the administration of appropriate therapy and/or reducing the risk of complications.

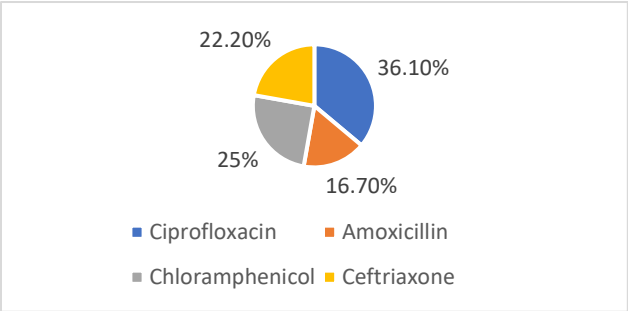
One of the therapies in the management of typhoid is the administration of antibiotics. According to Rahmasari & Lestari (2018), there are seven strains of antibiotics that are commonly given to typhoid patients, namely Ciprofloxacin, Cefixime, Amoxicillin, Chloramphenicol, Thiamphenicol, Azithromycin and Ceftriaxone. Antibiotics are usually given for 5-7 days after the patient has confirmed typhoid. Salmonella antigen tests can be used to evaluate the success of typhoid treatment and ensure the patient has recovered. In general, if typhoid treatment is successful, the Salmonella antigen test gives a negative result. In some cases, positive results were still found in some patients, indicating that there is still Salmonella typhi bacteria left (Geneteh et al., 2023 ; Saini & Duggal, 2022). A positive result of Salmonella antigen after treatment, indicates the need

for further supervision and monitoring in such patients to ensure a perfect recovery. Regular monitoring of Salmonella antigen test results after treatment is essential to ensure effective bacterial eradication, help monitor the effectiveness of treatment and detect possible persistent infection or reinfection. Evaluation of the results of this examination is important in planning the appropriate treatment follow-up for typhoid patients.

METHOD

The type of research is observational with a cross sectional approach. The sample was in the form of anal swabs from 36 patients who were diagnosed positive for typhoid based on the Widal test or Tubex test laboratory examination and underwent treatment with antibiotics Ciprofloxacin, Chloramphenicol, Ceftriaxone and Amoxicillin. Anal swabs are taken on days 5, 10 and 15 after receiving antibiotic treatment. The swab uses a sterile cotton swab and is then dissolved in the reagent buffer. The suspension was then applied to the S. thypi Ag Rapid Test kit. The positive result was stated by the formation of two lines on the control and test.

RESULTS AND DISCUSSION



Picture 1. Percentage of use of types of antibiotics in the treatment of typhoid fever.

Figure 1 shows the most widely used antibiotic ciprofloxacin in the treatment of typhoid (36%), followed by chloramphenicol (25%), ceftriaxone (22.2%) and amoxicillin (16.7%).

Table 1.
Positive results of S. thypi/S. parathypi Ag Rapid Test on days 5, 10 and 15 regardless of the type of antibiotic used

Result	Day 5	Day 10	Day 15
Positive	10 (27,8%)	8 (22,2%)	4 (11,1%)
Negative	26 (72,2%)	28 (77,8%)	32 (88,9%)

The table above shows a decrease in the number of positive samples found for *Salmonella thypi* and *Salmonella parathypi* bacteria, from 27% on day 5 to 11.1% on day 15 regardless of the type of antibiotic used.

Table 2.
Positive results of S. thypi/S. parathypi Ag Rapid Test on days 5, 10 and 15 based on antibiotic used

Antibiotic used	Positive result by day of examination		
	Day 5	Day 10	Day 15
Ciprofloxacin	3	2	1
Amoxicillin	1	2	2
Chloramphenicol	3	2	1
Ceftriaxone	3	2	0

Table 2 shows the number of positive samples examined on days 5 to 15 showing a decrease in most types of antibiotics used in typhoid treatment.

The main choice of antibiotics depends on the susceptibility pattern of *Salmonella typhi* and *Salmonella paratyphi* bacteria. The original first line therapy is Chloramphenicol, Ampicillin and Trimethropim sulfametoxazole. They are effective against sensitive bacteria, although resistance to these drugs is often found (Harris & Brooks, 2013). In this study, two types of antibiotics that are widely given in the treatment of typhoid are Ciprofloxacin and Chloramphenicol with a percentage of use of 36.10% and 25% respectively (Picture 1). This found in line with Wain et al (2014) who stated that Ciprofloxacin provides the most intensive therapeutic effect because it has a cure rate of 98%, a relapse rate and a fecal carier rate of <2%. These two types of antibiotics can also be given to children as well as adults. The results of the Salmonella rapid antigen test in the days after typhoid treatment as shown at Table 1, were:

a. On the 5th day after treatment, 27.8% of the samples showed positive results. This indicates that Salmonella typhi bacteria can still be detected in the patient's body, even if the patient has received treatment. This percentage is quite high, indicating that the treatment has not been fully successful in radicalizing the bacteria in some patients.
b. On the 10th day after treatment, the percentage of positive samples decreased to 22.2%. This decrease indicates improvement or healing in some samples during the treatment period. The presence of samples that are still positive indicates that the treatment is not effective in some patients.
c. On the 15th day after treatment, the percentage of positive samples decreased further to 11.1%. This more significant decrease suggests that most patients show improvement after 15 days of treatment, but there are still about 1 in 9 patients who remain positive, indicating the presence of persistent infection or possible antibiotic resistance in a small percentage of cases.

The results of this study show that typhoid treatment with antibiotics is not fully effective in radiating the causative bacteria in all patients. There are still around 11.1% of patients who still show positive results on the rapid antigen test, even after 15 days of treatment. This indicates the need for further surveillance and monitoring in typhoid patients after treatment and further research is needed to identify the factors that affect the ineffective eradication of bacteria in some of these patients. Positive results were found on all types of antibiotics used in typhoid treatment (Table 2). A positive result on a Salmonella antigen test after treatment can be caused by several factors, including antibiotic resistance, reinfection, improper storage and delivery of samples, limitations of diagnostic tests, and a history of persistent infection (Yang et al., 2018; Alba et al., 2016). Antibiotic resistance can cause *Salmonella typhi* bacteria to not be radiated effectively, so it is still detected in the patient's body. Research by Suswati & Juniarti (2011) and Sarmadi et al (2021) showed that some *Salmonella thypi* bacteria isolated from typhoid patients being resistance to chloramphenicol, ceftriaxone and amoxicillin antibiotics. Meanwhile, the antibiotics meropenem and ciprofloxacin still provide sensitive results against *Salmonella typhi* bacteria.

CONCLUSION

There was a decrease in the number of positive samples from day 5 to day 15, indicating improvement or recovery in some samples. Periodic monitoring of Salmonella antigen examination results after treatment is crucial to ensure effective bacterial eradication.

REFERENCES

Alba, S., Bakker, M.I., Hatta, M., Scheelbeek, P.F.D. and Dwiyanti, R. (2016). Risk Factors of Typhoid Infection in the Indonesian Archipelago. PLoS One, 11(6). https://doi.org/10.1371%2Fjournal.pone.0155286.

Basnyat, B., Qamar, F. N., Rupali, P., Ahmed, T., and Parry, C.M. Enteric fever. (2021). BMJ. 26(372). https://doi.org/10.1136/bmj.n437.

Geneteh, A., Tadesse, S., Biset, S., Girma, L., and Fissiha, P. (2023). Rapid stool antigenic test for typhoid fever among suspected cases, Northeast, Ethiopia. Scientific report, 13:649. https://doi.org/10.1038/s41598-023-27909-5

Harris, J. B., & Brooks, W. A. (2012). Typhoid and Paratyphoid (Enteric) Fever. In Hunter's Tropical Medicine and Emerging Infectious Disease: Ninth Edition (pp. 568-576). Elsevier Inc.. https://doi.org/10.1016/B978-1-4160-4390-4.00069-2

Meiring JE, Khanam F, Basnyat B, Charles RC, Crump JA, Debellut F, Holt KE, Kariuki S, Mugisha E, Neuzil KM, Parry CM, Pitzer VE, Pollard AJ, Qadri F, Gordon MA. (2023). Typhoid fever. Nat Rev Dis Primers. 9(1):71

Rahmasari, V and Lestari, K. (2018). Review: Manajemen Terapi Demam Tifoid: Kajian Terapi Farmakologis dan Non Farmakologis. Farmaka, 16(1) : 184-195. https://doi.org/10.24198/jf.v16i1.17445.g8634

Saini, V and Duggal, N. (2022). Comparison of Rapid Test (antigen vs antibody) for the Diagnosis of Typhoid in the First adan Second Weeks of Fever. J Family Med Prim Care, 11(7), 3730-3734. https://doi.org/10.4103%2Fjfmpc.jfmpc_2329_21

Sarmadi, S., Nizar, M. and Putri, E. (2021). Uji Resistensi In Vitro Salmonella typhi yang Diisolasi dari Penderita Demam Tifoid terhadap Berbagai Antibiotik dengan Metode Cakram Kirby-Bauer. Jurnal Kesehatan Pharmasi, 3(1), 25-31.

Suswati, I and Juniarti, A. (2011). Sensitivitas Salmonella typhi terhadap Kloramfenikol dan Seftriakson di RSUD Dr. Soetomo Surabaya dan di RSUD Dr. Saiful Anwar Malang Tahun 2008-2009. Jurnal Biomedika. 3(1)

Wain, J., Hendriksen, R. S., Mikoleit, M. L, Keddy, K. H, Ochiai, R. L. (2015). Typhoid fever. Lancet;385(9973):1136-45. https://doi.org/10.1016/s0140-6736(13)62708-7

WHO. (2023). Typhoid. https://www.who.int/news-room/fact-sheets/detail/typhoid

Yang, Y.A., Chong, A., and Song, J. (2018). Why Is Eradicating Typhoid Fever So Challenging: Implications for Vaccine and Therapeutic Design. 6(3): 45. https://doi.org/10.3390%2Fvaccines6030045