

Contribution of the Widal-Felix serodiagnostic in the diagnosis of salmonellosis at University Teaching hospital of Fann (Dakar)

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Received: 01 July 2024; Accepted: 05 July 2024; Published: 09 July 2024

Citation: Madiagne DER. Contribution of the Widal-Felix serodiagnostic in the diagnosis of salmonellosis at University Teaching hospital of Fann (Dakar). AJMCRR 2024; 3(7): 1-6.

ABSTRACT

Introduction - Salmonellosis is rare in developed countries, but relatively common in developing countries, with over 21 million cases per year, including 1-4% of deaths from complications. The aim of this study is to demonstrate the contribution of Widal et Félix serodiagnosis to the diagnosis of salmonellosis at CHNU de Fann.

Material and methods. This is a retrospective descriptive study based on registry exploitation. It spans a 5-year period from January 2013 to December 2017. All patients who underwent Widal and Felix serodiagnosis during the study period were included. Data were collected and processed using Epi Info software version 3.5.4.

Results. 48 positive Widal and Felix serodiagnostics out of a total of 4055 tests, representing a positivity rate of 1.2%. The mean age of patients was 20 years, with extremes of 1 and 97 years. The majority of patients were male, with a sex ratio of 0.97. The majority of patients came from the Albert Royer Children's Hospital, with 38% of serodiagnosis requests from Widal and Félix. CHNU Fann departments accounted for only 13% of requests, 9% of which came from the emergency department (SAU).

Five Salmonella serotypes were identified: Salmonella typhi (40%), Salmonella enteritidis (23%), Salmonella Paratyphi A (13%), Salmonella Paratyphi B (13%) and Salmonella Paratyphi C (10%).

Conclusion: *Widal et Félix serodiagnosis enables us to distinguish between Eberth bacillus and other salmonella infections whenever blood and stool cultures are negative. Combined with coproculture and/or blood culture, depending on the course of the disease, it ensures better management of these conditions.*

Key words: Salmonellosis; Widal et Félix serodiagnosis; CHNU Fann

Introduction

Salmonellosis is a major public health problem worldwide. Typhoid and paratyphoid fevers are rare in developed countries, but relatively frequent in developing countries, with over 21 million cases per year, including 1 to 4% of deaths due to complications [1].

The detection of agglutinating antibodies in the serum of patients is the only serological test commonly used in typhoid fever. This indirect diagnostic method is the only biological element that can be interpreted to distinguish between infection with Eberth's bacillus, and infection with Salmonella ParatyphiA, B or C, whenever blood and stool cultures are negative due to prior antibiotic therapy [2].

It is in this context that we have undertaken this work, the general objective of which is to determine the contribution of Widal and Félix serodiagnosis in the diagnosis of Salmonellosis at the CHNU de Fann.

The specific objectives are as follows:

- determine the epidemiological and clinical profiles of patients benefiting from Widal and Félix serodiagnosis at CHNU de Fann
- determine the prevalence of different Salmonella serotypes.
- compare Widal and Félix serodiagnostic results with those of stool and/or blood cultures

Patients and methods

Patients
We analyzed the results of 4055 Widal and Félix serodiagnostic tests performed at the bacteriology and virology laboratory of CHNU de Fann in Dakar from January 2013 to December 2017 (5 years).

Methods

Data were collected from laboratory records, using a data collection form that included epidemiological (age, sex), clinical (diagnosis) and biological parameters (results of Widal and Félix serodiagnosis, coproculture and blood culture).

Data were processed using Epi Info software version 3.5.4.

The tube agglutination technique was used to perform the Widal et Félix serodiagnosis. Two separate dilutions (1:10e and 1:20e) of the test sera are made. Centrifuge for 5 minutes at 3,000 rpm to sediment the bacterial suspension, and take a light reading by gently shaking the tube and re-suspending the pellet.

Results

Epidemiological and clinical aspects

Most patients were between 0 and 20 years of age (46%). The mean age in our study was 20 years, with extremes of 1 and 97 years. The distribution of patients by sex showed a slight female predominance, with a sex ratio (M/F) of 0.97.

The highest number of requests for serodiagnosis

from Widal and Félix was obtained in 2016, with 1,036 tests carried out, of which 11 were positive.

The highest number of positive samples was obtained in 2015 (Figure 1).

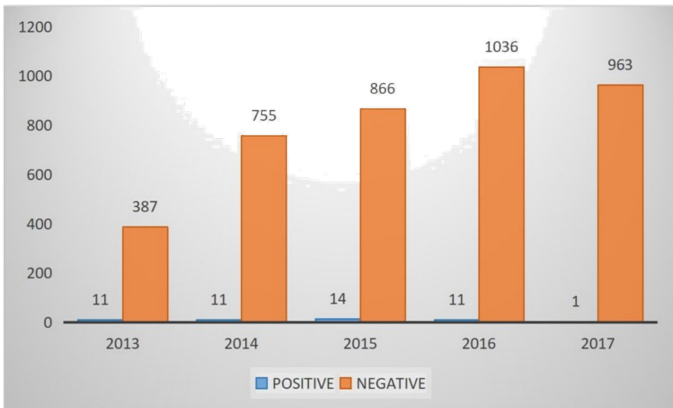


Figure 1: Distribution of samples by year

In 25% of patients tested, the request was prompted by an infectious syndrome, and in 12% by abdominal pain (Table I).

Table I: Distribution of positive tests according to diagnosis

| Diagnosis | Workforce | % |
|---|-----------|-------|
| Not specified by doctor | 22 | 45,83 |
| Infectious syndrome | 12 | 25,03 |
| Abdominal pain | 6 | 12,5 |
| GEA | 2 | 4,16 |
| Sepsis/sickle cell disease | 1 | 2,08 |
| Headache | 1 | 2,08 |
| Osteomyelitis/sickle cell disease | 1 | 2,08 |
| Digestive hemorrhage | 1 | 2,08 |
| Suspicion of typhoid fever | 1 | 2,08 |
| Infectious syndrome/sickle cell disease | 1 | 2,08 |
| Total | 48 | 100 |

In 25% of patients tested, the request was prompted by an infectious syndrome, and in 12% by abdominal pain (Table I).

Biological aspects

Of a total of 4,055 Widal and Félix serodiagnostics performed, only 48 were positive, representing a rate of 1.2%.

In our study, Salmonella Typhi (40%) and Salmonella Enteritidis (23%) were the most frequently found serotypes, followed by S .Paratyphi A (13%) , S .Paratyphi B (13%) and S .Paratyphi C (10%)(Figure 2).

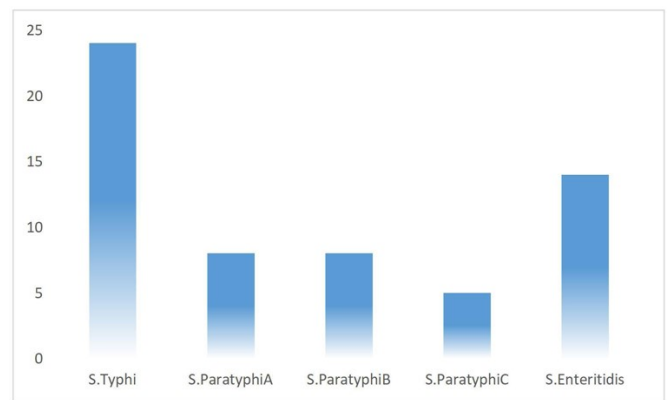


Figure 2: Frequency of serotypes

Of the 48 patients tested positive by the Widal et Félix serodiagnosis, 8 underwent blood and/or stool cultures at the Fann bacteriology laboratory.

Only one patient had a positive coproculture with a serotype identical to that found with the widal and Felix serodiagnosis.

Discussion

Most of the patients were young, aged between 0 and 20 years (46%). This could be explained by the origin of these patients, many of whom came from the Albert Royer Children's Hospital in Dakar.

Our results differ from those of [12] whose predominant age range was between 21 and 30 years. disease reinforces the positive predictive value of this test.

In another study in Mali [3], the majority of patients were aged between 11 and 30 (73%). The low sensitivity of blood and gastrointestinal cultures explains the systematic use of the Widal et

In 1973 in Dakar [13] found that the 21-30 age group was the most affected, at 11.22%. However, typhoid fever remains a disease of adolescents and adults, as numerous studies have shown [5,3]. Felix serodiagnosis when salmonellosis is suspected.

The symptomatology of these salmonellosis varies according to the virulence of the serotype in question and the susceptibility of the host [4]. Nevertheless, direct diagnosis should be preferred to indirect diagnosis. Indeed, the serodiagnosis of Widal and Félix is highly controversial, not least because of its lack of specificity.

Of the 4055 requests for serodiagnosis from Widal and Félix, 48 were positive, a rate of 1.2%. Nevertheless, this test is still widely used and forms the basis of the largest number of diagnoses [7,9], as the following studies demonstrate.

In our series :

- Salmonella Typhi was isolated 24 times, i.e. 40%. In 2009 in Bamako [11] rapportait 1992 sérodiagnostics de Widal et Felix positifs sur 4254 demandes soit 22%. In this series :
- Salmonella Paratyphi A was isolated 8 times, or 13%.
 - Salmonella Typhi was isolated 850 times (42.67%).
 - Salmonella Paratyphi C was isolated 485 times (24.35%).
 - Salmonella Paratyphi A was isolated 390 times (19.58%).
 - Salmonella Paratyphi B was isolated 267 times (13.40%).
- Salmonella Paratyphi B was isolated 8 times, i.e. 13%.
- Salmonella Paratyphi C was isolated 5 times, i.e. 10%.
- Salmonella Enteritidis was isolated 14 times (23%)

For most patients, the diagnosis could not be confirmed by blood or stool cultures. Concerning the frequency of positive serodiagnosis, our results are clearly below those of Nimo I et al [Nimo I. Evaluation du diagnostic biologique de la fièvre typhoïde au niveau du CHU

The latter were not systematically requested by doctors, or were carried out outside Fann hospital. GT , DU CHU DU POINT G ET DE L'INRSP0, étude rétrospective .Thèse Med 2009 ,Bamako] in their study carried out in Bamako in 2009. Using

According to Hamze et al [5], in endemic countries, where culture facilities may be lacking [6,7 ,8], the Widal-Félix serodiagnosis remains the most economical means of diagnosing salmonellosis. Moreover, in certain regions, the higher prevalence of the the same method, they found 22% positive tests versus 1% in our study. This difference can be explained by the different living conditions of populations in different countries, salmonellosis being favored by a low socio-economic level.

On the other hand, for the different salmonella serotypes obtained, our results are comparable to those of Nimo I et al [11].

In 2011, Bore D et al [14] rapporte dans son étude un taux de 45% de sérodiagnostics de Widal et Félix positifs sur un total de 220 tests réalisés avec comme sérovary :

- Salmonella Typhi, isolated 81 times (36.8%)
- Salmonella Paratyphi A, isolated 20 times (9.1%)
- Salmonella Paratyphi B, isolated 46 times (20.9%)
- Salmonella Paratyphi C, isolated 19 times (8.6%)

In Dakar, Lezou et al [15] report on 198 serodiagnoses carried out, 184 Salmonella Typhi, 3 Salmonella Paratyphi B and Salmonella Paratyphi C.

In a multicenter survey [10] of salmonellosis in France in 1990, 197 strains were identified, including 88 S. typhimurium (44%) and 39 S. enteritidis (20%).

Conclusion

Widal et Félix serodiagnosis enables us to distinguish between Eberth bacillus and other salmonella infections whenever blood and stool cultures are negative. Combined with coproculture and/or blood culture, depending on the course of the disease, it ensures better management of these conditions.

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