

INCREASED ACCURACY OF CSF ANALYSIS THROUGH NAAT AND A QUICK RESPONSE TIME REDUCE HOSPITALIZATION TIMES

Jean Longtin, M.D., Julie Bestman-Smith, M.D., Ronald Bérubé and Nathalie Boucher

INTRODUCTION

For public health reasons, the proper administration of treatments and the reduction of costs, it is crucial to quickly detect the bacterial agents that cause meningococcal meningitis.

Given that “Even when the disease is diagnosed early and adequate treatment is started, 5% to 10% of patients die,”¹ it is imperative to use the means necessary to administer the right treatment to each patient as quickly as possible.

In the early stages of the disease, a bacterial culture of the cerebrospinal fluid (CSF) may be insufficient, and may lead to negative results, especially when the sample is taken after antibiotic therapy has begun.

The use of the multiplex NAAT (nucleic acid amplification test), which identifies a number of pathogens, makes it possible to increase the positivity rate and the certainty of clinical diagnosis, as long as the right relevance criteria are used, and thus to ensure optimal treatment for the patient.

“The results obtained from patients under 5 years of age show us that the NAAT is particularly useful in pediatrics for establishing a diagnosis with certainty, in addition to playing an important role in certain peripheral establishments.”

FRANÇOIS BOUCHER, M.D.

RESULTS

This study has convincing results regarding the use of the FilmArray® ME kit in an in-patient clinic setting²:

- Quick cessation of inappropriate treatment initiated prior to lumbar puncture
- Informed choice of treatment with direct benefits for the patient
- Fast and highly suitable patient care
- Savings in hospitalization and treatment costs
- Short response time particularly beneficial for young patients
- Average length of stay reduced by nearly one day in Pediatrics

Table: Comparison of Hospital Stays Based on Type of Test

| Tests | May–Oct. 2016 | | May–Oct. 2017 | |
|----------------------------------|---------------|----------|---------------|--------------------|
| | CSF Culture | HSV NAAT | CSF Culture | Multi NAAT (MENMU) |
| Length of hospitalization (days) | 3.83 | 5.35 | 2.96 | 2.69 |

For patients 0 to 19 years old admitted to Emergency at the CHUL, and who were subject to a culture request, there is a reduction in the length of hospital stay by approximately one day.

CONCLUSION

Use of the FilmArray ME kit promotes a reduction in the length of stay, an appropriate and timely treatment, and, consequently, savings in pharmacotherapy as well as better care for patients, particularly in Pediatrics.

METHODOLOGY

- 758 tests were conducted between May 7, 2017, and July 1, 2018.
- 53% of requests came from the CHU de Québec, and the rest came from other hospital sites throughout the province.
- 323 NAAT requests (42%) came from Pediatrics.
- Internal validity was verified through CSF tests simulated using bacterial pathogens (MENMU), *Cryptococcus neoformans*, HSV, VZV and Enterovirus.
- The white blood cell count was available in 63% (478) of the CSF samples. Using leukorachia (< 10 WBC) as a relevance criterion increases the pre-test probability and provides a high rate of positivity (43%) when respected.