Availability of 24/7 Rapid HSV PCR Test Directly Impacts Acyclovir Exposure in Pediatric Patients

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INTRODUCTION

Herpes simplex virus (HSV) infection of the central nervous system (CNS) is associated with significant morbidity and mortality in children. Current guidelines recommend early treatment of all suspected HSV CNS infection with intravenous acyclovir and to perform diagnostic testing. Testing of cerebrospinal fluid (CSF) for HSV by polymerase chain reaction (PCR) is currently the diagnostic method of choice. Ruling out HSV infection with PCR has been shown to result in savings and avoidance of unnecessary drug costs and adverse reactions, including nephrotoxicity and inflammation. Turn-around-time (TAT) of HSV PCR is dependent on laboratory testing availability. This study assessed the impact of a direct HSV (dHSV) PCR assay on acyclovir therapy in children suspected for HSV CNS infection.

METHODS

A retrospective analysis was conducted on pediatric patients presenting to the Emergency Department at Children’s Hospital Los Angeles (CHLA) with signs and symptoms of meningitis or encephalitis. A total of 208 pediatric patients with HSV PCR on CSF were included in the study. Patients with unexplained, long-term medical conditions were excluded.

RESULTS

The more rapid TAT of dHSV results were 56.6% between 8am-6pm and 43.4% for 6pm-8am. All results were reported in the electronic medical records. Medical chart review was performed to determine initiation and duration of acyclovir therapy. The following analyses were performed:

- Co-morbidities (%)
- Male (%)
- <30 days old (%)
- Time from specimen collection to result reporting
- Time from result reporting to halting acyclovir

Table 1. Characteristics of 208 patients from the pre- and post groups

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<td>Pre</td>
<td>35 (32%)</td>
<td>59 (54%)</td>
<td>30 (28%)</td>
<td>12.3 h (1 day – 21 years)</td>
<td>6.9 h (1 day – 58.1 h)</td>
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<tr>
<td>Post</td>
<td>33 (33%)</td>
<td>50 (46%)</td>
<td>20 (19%)</td>
<td>5.0 h (1 day – 72.7 h)</td>
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CONCLUSIONS

Implementation of the dHSV PCR assay significantly reduced the average turnaround time from collection to results reporting. The more rapid TAT of dHSV impacted patient care and management with the exclusion of HSV infection resulting in a reduction in the duration of potentially unnecessary acyclovir therapy.

ACKNOWLEDGEMENTS

We would like to thank the staff in the Clinical Microbiology and Virology Laboratories at Children’s Hospital Los Angeles for their technical support.

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Figure 1. Specimen Collection to Result Reporting

Figure 2. Time of Specimen Collection to Result Reporting

Figure 3. Reporting Distribution of Post-implementation Group

Figure 4. Time to Changes in Therapy

RESULTS

Acyclovir was prescribed to 71 (67%) and 70 (71%) patients in the pre- and post-implementation groups, respectively (Table 1).

- Mean duration of therapy for all and for HSV negative patients were not significant, 26.4 h vs 15.3 h (p = 0.15) and 24.2 h vs 12.3 h (negative patients, p = 0.29) (Table 1).

- Two patients were prescribed acyclovir but no dose was given because results were reported prior to initiation of treatment.

- Mean time from specimen collection to acyclovir discontinuation for the HSV negative patients was 10.4 hours longer pre-implementation (26.4 h vs 15.3 h; p = 0.01), with ranges of 4.2 h – 56.1 h (pre) and 1.4 h – 22.7 h (post) (Figure 4).

- Mean time from specimen collection to acyclovir start and PCR result to acyclovir stop were not significant at 6.9 h vs 5.0 h (p = 0.2) and 5.0 h vs 8.7 h (p = 0.4), respectively (Figure 4).

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