Conclusions

The differences in notification time highlight the different ways of communication and the need for harmonization. The magnitudes yielding a higher number of critical reports are associated with prevalent pathologies in our country. The revision of medical data brings to light the difficult evaluation of the real impact in the management of the patient; since there is no information on whether there was anticipation or not, thanks to the immediate notification by the laboratory.

The periodic revision of the notification protocol enables to improve safety and decrease patient morbidity and mortality in our healthcare system.

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W457

Establishment of laboratory critical values protocol and impact of their communication to clinicians

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Background-aim

A critical value is a laboratory result that indicates that the patient is in a life-threatening pathological situation unless the treatment begins immediately. The detection by the laboratory and urgent communication of these results to the clinician has a high impact on patient safety.

It is therefore essential to define a protocol for action on critical laboratory results that must be communicated urgently to the requesting physician.

During the past year we have implemented a notification protocol for critical values in our laboratory. The objective of this work is to evaluate the results obtained in the after its implantation.

Methods

We define a consensus list with the clinicians from our Hospital, in order to avoid unnecessary notifications, in which a selection of tests and their respective critical results are specified, differentiating for some parameters hospitalized patients (L1) from primary care or emergency unit patients (L2). The notification is made by the laboratory medical staff to the requesting doctor or to the nursing staff responsible for the patient. The defined critical values are configured in the Modulab (Werfen) laboratory information system (LIS) so that a notification alarm is activated before the result is validated. Once the notification is made, the informed value is recorded in the LIS, as well as the person making the notice, the date and to whom it is communicated. We conducted a retrospective study quantifying all the notifications registered in our SIL from January to December 2018.

Results

In the first year after its implementation, a total of 1552 analytics with a critical value were registered, which represents 0.36% of the total number of requests received in our laboratory. A total of 389 values were not notified as the warning was not applicable due to previously known results. On 47 occasions the warning could not be made because it was not possible to locate the patient, the requesting doctor or the nursing staff. 66.4% of the reported critical values corresponded to hospitalization and emergency patients, while the remaining 33.6% corresponded to patients from outpatient clinics and primary care. The critical parameters reported and their frequency are:

Creatinine>7.5 mg/dL: 4.2%; glucose <35 (L1) and < 40 mg/dL (L2): 14.8%; glucose>450 mg/dL (L2) and > 800 mg/dL (L1): 21.2%; Creatinkinase>20,000 U/L: 2.9%; Total Calcium <4 (L1) and < 6.5 mg/dL (L2): 2.1%; Total calcium>13 mg/dL: 5.4%; Potassium <2 (L1) and < 2.5 mEq/L (L2): 3.8%; Potassium>6.5 (L2) and > 7.8 mEq/L (L1): 19.3%; Sodium <115 (L1) and < 120 mEq/L (L2): 9.8%; Sodium>160 (L2) and > 170 mEq/L (L1): 1.3%; Chlorine <70 mEq/L: 0.8%; Chlorine>130 mEq/L: 0.9%; Phosphorus <1 mg/dL: 3.8%; Phosphorus>9 mg/dL: 1.1%; Magnesium <1 mg/dL: 2.1%; Magnesium>4.7 (L2) and > 6 mg/dL (L1): 0.6%; Digoxin>2.5 ng/mL: 5.9%.

Conclusions

A large number of the notifications made correspond to patients from primary care and outpatient clinics in which the clinician does not usually see the results until the next visit of the patient, in these cases the urgent warning from the laboratory helps in a considerable way to improve the patient safety facilitating earlier medical care. The most frequently reported critical values were alterations in glucose levels, mainly hyperglycemia, followed by alterations of ion values, mainly due to hyperkalemia and hyponatremia.

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W458

Evaluation of procalcitonin in a fluorescent immunoassay AFIAS-6 analyzer

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Background-aim

The procalcitonin (PCT) is a peptide precursor of calcitonin composed of 116 amino acids. In normal state it is produced, above all, by the C-cells of the thyroid gland, and serum concentrations released are very low. Bacterial infections stimulate the PCT production in all parenchymal tissues, and blood levels rise rapidly with the severity of the infection. The availability of Point-of-care testing (POCT) equipments for the measurement of PCT would be of great interest by reducing the time of diagnosis for patients with suspected severe infection and sepsis and to guide antibiotic therapy.

Methods

The POCT AFIAS PCT (Boditech) analyzer is an automated fluorescent immunoassay system to measure the concentration of PCT. The analyzer has a measurement range of 0.1 to 100 µg/L and uses 50 µl of sample.

Serum levels of PCT were measured in 200 samples using the methodology AFIAS 6 and Kryptor Compact Plus analyzer (Thermo-Fisher) to perform a comparison of the results. To assess the precision of the AFIAS-6 two commercial controls (Liaison Control Brahms PCT II) were used, where PCT was measured 10 times on the

same day and 10 times on different days to obtain the intra- and interassay coefficients of variation (CV).

Statistical analysis was performed using the Passing-Bablock method.

Results

The Intra-assay CV was 4.44% and 5.69% for the low and high control, respectively. The mean and standard deviation observed were 1.49 ± 0.07 and 46.79 ± 2.66 in each case. The inter-assay CV for these controls was 5.66% and 4.38% with a mean of 1.45 ± 0.08 and 45.76 ± 2.0 respectively.

The results showed a high correlation, with a slope of 0.989 (95% confidence interval 0.940–1.028) and an intercept of −0.026 (−0.041–0.001). The correlation coefficient (r) was 0.991. A comparison was also made between both devices for samples with a PCT concentration between 0.5 and 10 μg/L (n: 101) with a slope of 1119 (1020-1228), intersection of −0.128 (−0,270-0,018) and r: 0,897.

Conclusions

Our data suggests that the PCT test AFIAS shows a good correlation with the Kryptor Compact Plus analyzer, with an acceptable precision, being the CV always lower than 6%.

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W459

Evaluation of CBC and CRP with two automated hematology analyzer microsemi CRP for 3-part WBC differential and CRP and Pentra MS CRP for 5-part WBC differential and CRP

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Background-aim

C-reactive protein (CRP) and white cell count are parameters used for the diagnosis of infection. Laboratory testing requires different specimens, like whole blood for Cell Blood Count (CBC) and serum for CRP. The analyzer Microsemi LC-667G CRP system (Horiba Medical) has been developed as compact laboratory instrument capable of simultaneous measuring of complete CBC including 3-part differentials of white blood cells (WBC) and CRP and Pentra MS CRP (PMS) (Horiba Medical) provide 5-part differential of leukocytes (5-Diff) and CRP, both using a small volume of whole blood anticoagulated with ethylenediaminetetraacetic acid (EDTA).

The aim of this study was to compare the results of CBC and CRP assayed on the same patient sample, using both Point-Of-Care (POC) systems and the current laboratory methods.

Methods

A total of 117 samples were analyzed using both Microsemi CRP and PMS systems. They can get a result without blood clotting and centrifuge separation 4 min later. In order to confirm usability of these analysers and comparability with routine analyzer, we evaluate simultaneous repeatability, day to day reproducibility and the correlation with current methods for CBC and CRP. The routine laboratory CBC uses the ADVIA 2120i analyzer (Siemens) and the laboratory serum CRP assay was operated on DxC 700 AU (Beckman Coulter).

Results

Repeatability with Microsemi CRP of control L, M and H were CV5%, 5% and 2% respectively. Repeatability with PMS of control L, M and H were CV2%, 1% and 2% respectively. Repeatability with PMS was better than repeatability with Microsemi CRP.

Day to day reproducibility with Microsemi CRP of control L, M and H were CV4%, 4% and 3% respectively. Day to day reproducibility with PMS of control L, M and H were CV2%, 2% and 3% respectively. Reproducibility with PMS was better than reproducibility with Microsemi CRP.

Correlation coefficient between the routine analyzer and Microsemi CRP was 0.99 for CRP, 0.99 for WBC, 0.99 for red blood cell (RBC), 0.99 for hemoglobin (HGB), 0.99 for hematocrit (HCT) and 0.99 for platelets (PLT). Correlation coefficient between the routine analyzer and PMS was 0.99 for CRP, 0.99 for WBC, 0.99 for RBC, 0.99 for HGB, 0.99 for HCT and 0.99 for PLT.

Conclusions

The results obtained on the Microsemi CRP system and PMS are well correlated with routine methods. The opportunity of using only one specimen for both tests (CRP and CBC) and its application to a POC system appear very useful for diagnosis of infection, especially in the emergency unit of hospitals or primary care units.

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W460

Rapid diagnosis of viral infections using the real-time fluorescence loop-mediated isothermal amplification

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Background-aim

Loop-mediated isothermal amplification (LAMP) developed originally by Notomi et al. (2000), is one of the most perspective methods for point-of-care diagnostics. The reaction takes place at a constant temperature, without complex and expensive equipment and demonstrates high specificity and sensitivity comparable to PCR. The aim of this study was to develop approaches for the rapid detection of DNA viruses by LAMP with real-time fluorescent detection (RT-LAMP) and evaluation the diagnostic value of the method.

Methods

Urogenital swabs, urine, saliva and blood samples containing Herpes simplex virus 1 and 2 (HSV-1 and HSV-2) DNA ($N = 33$) and samples without of HSV DNA ($N = 27$), some of those contains Cytomegalovirus, Epstein–Barr virus and Human herpesvirus 6 DNA ($N = 17$). Feces, blood and rectal swabs of various species of predatory animals with confirmed parvovirus enteritis ($N = 39$) and samples of healthy animals ($N = 31$). All samples were analyzed by RT-LAMP with intercalating dyes (SYTO-9, SYTO-82) and RT-PCR with TaqMan probes. Reference methods for detecting LAMP results