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Clinical Microbiology Labs and COVID-19

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Introduction

Clinical microbiology departments must swiftly adapt their organizational structure to accommodate a novel disease's abnormally high diagnostic demand. However, there are currently no data assessing the shift in variables such as variance in sample type, cost, and human resources for clinical microbiology departments. This essay compares the workload in the Microbiology Department during the epidemic to that of the same period last year. We evaluate changes to the sample, budget and staff [1]. We think our experience can be useful to other labs getting ready. The Hospital General is a public tertiary and reference hospital situated within the community it serves. About 350,000 people work there, and under normal circumstances, the Microbiology Department processes over 300,000 samples a year. We examine the work of the Microbiology Department in the same months prior to and following our country's coronavirus pandemic. The information was obtained from the laboratory's records. To extract nucleic acids, we used the Molecular System, Siemens, Abbott System, and Flex by Scientific.

Description

Thermofisher Scientific Quant Studio 5 Real-Time thermocyclers, the automated Infinity Gene Pert Cepheid device, and Strat a Gene qPCR were utilised for RT-PCR amplifications. Particularly during the first few months of the pandemic, when there was the greatest lack of products on the market, the most variety of approaches emerged. Aside from the very early start, when RUO tests were conducted, we have only ever utilised CE-marked systems [2]. When using multiplex kits or combinations of singleplex kits, samples were always deemed positive when at least two distinct targets were amplified. The runs always contained a combination of laboratory-owned controls made up of previously described, diluted, and aliquoted samples, as well as positive and negative controls supplied by the appropriate manufacturers. We employed the Tapaha system by, employing the Kingfisher as an extraction system, QuantStudio-5 as a Thermocycler as a standard procedure, and the gene pert system by Cepheid on its platform Infinity as a fast system, preferred from May through. Due to its higher cost and restriction on processing numerous samples at once, the latter was only utilised when patients needed a very quick response. Analysing laboratory sample data the laboratory's daily sample processing capacity, along with its daily admissions and population of 100,000, were recorded [3]. The total number of received samples and samples from each lab region were evaluated. Our lab started using IgGs anti-SARS-CoV-2 detection in the middle of April. For this, the Architect SARS-CoV-2 assay was employed. Evaluation of the budget for the laboratory and the requirements for human resources: The criteria used to determine the amount of staff needed during the pandemic were the number of technicians and staff members working each day, as well as the quantity of samples collected by each technician per day. These were given by the hospital's human resources division.

The money for the laboratory division was provided by the hospital's accounting division. The exact Fisher exact test was used to statistically analyse contingency tables, while Mann-U Whitney's test was applied to numerical variables. Summarises the total number of samples handled during both research periods in the clinical microbiology lab. Samples increased by 96.70% during March to December 2020 compared to 2019. The amount of samples handled each day increased by 96.70% as well. The distribution of samples received in the various sections of the laboratory is shown by a very large increase in the number of samples per 1000 admissions or samples per resident. Serology and virology suffered the most from the increased workload. The laboratory's other areas all decreased their number of employees. Genital tract samples to samples used for epidemiological surveillance were processed. There was a noticeable reduction in activities at the hospital that weren't related to caring for COVID patients, including surgical activities. The cost of the Microbiology division rose overall hire of new employees and the extension of shifts received out of this total, with the remaining funds going for laboratory supplies The most expensive products were PCR reagents nasopharyngeal sampling swabs and transport medium reagents for SARS-CoV-2 IgG reagents for SARS-CoV-2 extraction and purification In order to diagnose a new disease within a global epidemic, microbiology laboratories faced a tremendous adaptation challenge that is reflected in our results, which had to be met in a very short amount of time [4]. The number of samples received in the laboratory increased by 96.70% in 3 months, the number of shifts increased, and the need for diagnostic supplies in a highly competitive market led to a rise in work hours.

Several studies examining the adjustments needed in emergency, radiology, and intensive care have been however, there was almost nothing on the significant difficulty the epidemic has provided to clinical microbiology laboratories that we could locate. The Microbiology team had to swiftly adjust to the technology being employed and the information that was available. We had to put into practise procedures that had never been done before under normal circumstances, such installing equipment ourselves or operating veterinary diagnostic equipment. Plans for staff training were crucial. The majority of department personnel, residents, and technicians were necessary [5].

Conclusion

Techniques for detecting antibodies, employing autoanalyzers for immunoassays, and strengthening lab security were also covered in the course. High complexity samples, such as the SARS-CoV-2 PCR, which increased by 2058% throughout the month, were the main reason for the rapid expansion of the sample count. Over the course of ten months, CoV-2 PCRs and over 55,000 serological tests were performed, and the results were released every day. Throughout the pandemic, the hospital administration and the Microbiology and Infectious Diseases department have collaborated and communicated efficiently. The technical and scientific ability of the department has been recognized by the management.

Acknowledgement

None.

Conflict of Interest

None.

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