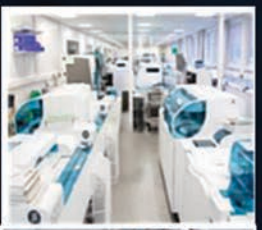

e-ABSTRACT BOOK

VIRTUAL

Chem Con 2021

12th Annual Conference of Chemical Pathology

Theme: Chemical Pathology Services in a Pandemic

5th - 6th Mar 2021

PROGRAMME DETAILS

VIRTUAL

Chem Con 2021

12TH Annual Conference of Chemical Pathology

"Chemical Pathology Services in a Pandemic"

5th – 6th March 2021

CONTENTS

WELCOME MESSAGE BY THE PRESIDENT PSCP & CHAIRMAN ORGANIZING COMMITTEE

Maj Gen Syed Raza Jaffar, HI (M)
Advisor in Pathology & Commandant AFIP, Rawalpindi
President PSCP & Chairman Organizing Committee ChemCon 2021

Dear Colleagues,

It is a great pleasure for me to cordially welcome you to **ChemCon 2021 & 12th Annual Conference of Chemical Pathology.** On behalf of Pakistan Society of Chemical Pathologists and the organizing committees at Armed Forces institute of Pathology Rawalpindi Pakistan, I greet all the participants from all over Pakistan. Main theme of the conference is, **"Chemical Pathology Services in a Pandemic"**. This conference has historical significance because of the times in which it is being planned and held. This pandemic and its fall out have a disruptive effect on each and every aspect of individual, collective, professional and sociocultural life. People from all walks of life had to come out of their comfort zones and explore and adapt to "new normal" encompassing everything. With this background and uncertainty for the short-term future, it was a collective and pragmatic decision by PSCP members to manage and carry out annual conference virtually and in person with a small group according to pandemic SOPs, just like the world over professional societies have planned. This is a challenge as there are no benchmarks, wider experiences and there is dearth of event organizers in this virtual format. Experts from different institutes and specialties are participating and will share their experiences to attendees. Communication of up-to-date in regard to chemical pathology services in the pandemic is the aim of present conference.

Conference and exhibition of scientific presentations is organized at Armed Forces Institute of Pathology on 5th and 6th March 2021. The scientific rigor and desirable participation by the chemical pathologist and clinicians are admirable. This will generate and foster culture of collaboratory research and development in the field of Chemical Pathology.

EDITORIAL

Brig Muhammad Aamir, SI(M)
Head Dept of Chemical Pathology and Endocrinology,
AFIP, Rawalpindi
Secretary Organising Committee ChemCon 2021

With great pleasure I welcome you to the special e-abstract book of ChemCon 2021. ChemCon 2021 will be held at Armed Forces Institute of Pathology on 5th – 6th March 2021. The main theme of this conference is **"Chemical pathology Services in a Pandemic"**. The team of people who have dedicated their time and effort to make this experience a success and bring forth the advancement of knowledge and practice for betterment of chemical pathology services in the country, deserve a special credit. We are hoping that technology and all related platforms do not fail us in our endeavors. The format includes both physical presence with virtual discussion so that same learning objectives can be met nationwide. It was worthwhile to invite our colleagues from other specialties to talk about their experiences during the pandemic. We are confident that our colleagues from all over the country and even remote areas shall be able to participate and shall be willing to bear with us with open heart and mind to make this conference a resounding success and make a difference for everyone.

I am especially thankful to President of PSCP for his untiring support and encouragement along with organizers at Armed Forces Institute of Pathology. We wish all the success to the presenters during the conference to achieve their professional goals. We invite and welcome junior pathologists from all over the country to join the Pakistan Association of pathologists.

COMMITTEES – CHEMCON 2021

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Prof Adnan Mustafa Zubairi	Karachi
Prof Asma Shaukat	Bahawalpur
Dr Anwar Magsi	Quetta

PROGRAMME DETAILS

TIME (HRS)	SCHEDULE	SPEAKERS
FIRST DAY: FRIDAY 5th Mar 2021		
INAUGURAL SESSION		
0830-0900	Registration of Participants	
0900-0915	Guests to be seated	
0915	Arrival of Chief Guest	
0920-0925	Recitation from Holy Quran	
0925-0930	National Anthem	
0930-0935	Welcome Address by **Maj Gen Syed Raza Jaffer, HI (M),** Advisor in Patholc	
0935-0945	Address by the **Ex-President PSCP**	
0945-0950	Address by the **Chief Guest**	
0950-0955	Presentation of Souvenirs	
0955-1005	Group Photograph with Chief Guest	
1005-1010	Departure of Chief Guest	
1010-1030	Lt Gen Syed Azhar Ahmad Lecture	
1030-1100	Light Refreshments	
PLENARY SESSION – I		
1100-1120	The COVID-19 Pandemic: Pathology Services - Unseen Force behind the Front-Line Warriors	Maj Gen Syed Raza Jaffar, HI(M)
1120-1140	COVID-19 Vaccination – Pakistan's Perspective	Maj Gen Salman Saleem
1140-1200	COVID-19 method validation during pandemic: Experience of CAP accredited lab`	Prof Farooq Ghani
1200-1220	COVID-19: Impact on clinical research and its implications for chemical pathology research	Prof Asma Shoukat
1220-1240	Leading role of pathology laboratories in curtailing the pandemic of	Brig (R) Aamir Ijaz

	COVID-19	
1240-1300	Impact of COVID-19 on laboratory professionals-a cross sectional survey at a clinical chemistry laboratory in a lower middle-income country	Prof Imran Siddiqui
1300-1415	Friday Prayers (Juma) & Lunch	
PLENARY SESSION – II		
1415-1435	Role of vitamin D in infection, progression and severity of COVID-19	Dr Aysha Habib
1435-1455	Evolving role of radiology in current pandemic	Brig Saerah Zafar
1455-1515	NEQAPP: Role of Clinical Chemistry Proficiency Testing Scheme in Quality Assessment of Medical Labs in Pakistan	Brig Muhammad Aamir, SI(M)
1515-1535	A pandemic: Challenges in diagnosis	Brig Eijaz Ghani
1535-1555	Development and validation of standard and real patient gallstone library using fourier transform infra-red spectroscopy	Dr Lena Jafri
1555-1615	Seroprevalence of SARS-COV-2 antibodies among healthy blood donors in Karachi, Pakistan	Dr Shabnam Khawaja
1615-1650	Refreshments	
1650-1715	PSCP Executive Council Meeting	
SECOND DAY: SATURDAY 6th Mar 2021 **PLENARY SESSION – III**		
0900-0920	Role of Procalcitonin in Diagnosis of Sepsis	Prof Adnan M Zubairi
0920-0940	NGS- a granary of information on tracking transmission and analyzing genomic variation	Col Zujaja Hina Haroon
0940-1000	Frequency of metabolic derangements in covid-19 patients	Dr Humaira Howra Ali
1000-1020	Copeptin – A new marker of interest	Lt Col Muhammad Usman Munir
1020-1040	Challenges, success factors and outcome of teaching and learning via virtual learning environment (VLE) in COVID-19 pandemic	Dr Hafsa Majid
1040-1100	Early diagnosis of coronary artery disease by micro RNA panel in patients with angina	Lt Col Sayed Tanvir Abbas Gilani
1100-1120	Light Refreshments	

SCIENTIFIC SESSION – I		
1120-1130	Correlation of blood Glucose levels with biochemical and hematological abnormalities in diabetic and non-diabetic Covid 19 Patients - Experience from a Tertiary Care hospital of Quetta	Maj Saima Bashir
1130-1140	Development of a virtual classroom for pre-analytical phase of laboratory medicine for undergraduate medical students using the Delphi technique with chemical pathology experts during the COVID-19 pandemicrole	Dr Muhammad Abbas Abid
1140-1150	Evaluation of adjusted calcium levels in patients of chronic renal failure with hypo-albuminemia	Dr Hunain Habib
1150-1200	Clinical evaluation of multiple serological diagnostic assays for detection of antibodies in COVID-19	Dr Hijab Batool
1200-1210	Evaluation of zinc levels in patients of CKD	Dr Kehkashan
1210-1220	Cross reactivity of COVID-19 IGG assay with known immune mediate disorders	Dr Nayab Zehra
1220-1230	Comparing the effect of hypoalbuminemia on sodium measured by indirect versus direct ion selective electrode method	Maj Athar Iqbal Paracha
1230-1240	Determination of diagnostic accuracy of biochemical parameters (CRP, LDH, Ferritin) in the diagnosis of covid-19 in suspected COVID cases	Dr Tayyaba Ashiq
1240-1250	Baseline Procalcitonin (PCT) for Anticipation of Severity and Mortality in a Set of Patients Hospitalized with COVID-19	Dr Muhammad Umer Naeem Effendi
1250-1300	Serum PIVKA-II: Reference interval of healthy population and establishment of its cutoff value for hepatocellular carcinoma diagnosis in Pakistan	Dr Faryal Husnain
1300-1310	Development and validation of a liquid chromatography – tandem mass spectrometry method for analysis of methylmalonic acid in serum	Maj Hamid Awais
1310-1320	Relationship between PCR and SARS COV2 antibody among healthcare workers	Maj Asma Khan
1320-1400	Lunch & Prayers	
SCIENTIFIC SESSION – II		
1400-1410	Association of hyaluronic acid and laminin with polymerase chain reaction findings in hepatitis c patients	Maj Tahir Asad
1410-1420	clinical and analytical validation of interleukin 6 (IL-6) in the clinical laboratory in COVID-19 pandemic	Dr Zaib-un-Nisa,

1420-1430	Assessment of national external quality assurance program of Pakistan (NEQAPP) as a tool for improving quality of lab results among participating laboratories	Maj Shahrukh Shah
1430-1440	Comparison of il-6 with other inflammatory markers and their association with different levels of severity of COVID-19 disease spectrum of biochemical	Dr Basma Bukhari
1440-1450	Comparison of estimated glomerular filtration rate with both serum creatinine and cystatin c (EGFRCR-CYS) versus single analyte (EGFRCR or EGFRCYS) using CKD-EPI and MDRD equations in tertiary care hospital settings	Maj Usama Bin Khalid
1450-1500	Association of liver and renal function derangements with disease severity in covid-19 patients	Dr Naila Hayat
1500-1510	Association of therapeutic dose of valproic acid and plasma glycine levels in epileptic patients	Maj Shakeel Ahmad
1510-1520	Alarming Increase of hypervitaminosis D in children: A Cross-sectional survey of Clinical Profiles and Pharmacological Factors from a Tertiary Care Center in Pakistan	Dr Siraj Muneer
1520-1530	Spectrum of biochemical derangements in patients with COVID-19 infection	Maj Sajjad Ali Haider
1530-1540	Paradigm shifts in vitamin d testing and diagnosis: a decade-long observational study	Dr Nawazish Zehra
1540-1550	Diagnostic accuracy of raised neutrophil gelatinase-associated lipocalin NGAL in predicting acute kidney injury after cardiac surgery	Dr Anum Iftikhar
1550-1600	Accuracy of glycated hemoglobin (HBA1C) analysis via POCT vs laboratory-based assay in department of pathology, Bahawal Victoria hospital, Bahawalpur	Dr Sameen Asghar
1600-1615	Vote of Thanks	

SECTION-1
PLENARY SESSION – I

ABSTRACT PLENARY SESSION – I

CC/PSCP-2021-PS1-Lec-001

THE COVID-19 PANDEMIC: PATHOLOGY SERVICES - UNSEEN FORCE BEHIND THE FRONT-LINE WARRIORS

Maj Gen Syed Raza Jaffar, HI(M)

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ABSTRACT

Coronavirus is an enveloped, positive single-strand RNA virus. After it's outbreak in December 2019 in Wuhan, Hubei Province of China, it's genome was released in January 2020. On 26 Feb 2020 first case of COVID-19 was reported in Pakistan. National Coordination Committee for Covid-19 was established at National Disaster Management Authority (NDMA) on 3rd April 2020. Smart lockdown policy was developed to prevent the spread of disease. New protocols established for PCR testing at AFIP in February 2020. PCR facility was established at ten CMHs throughout Pakistan in a record time of 3-4 weeks with ability to perform up to 200 tests per day. Pak Emirates Military Hospital Rawalpindi was designated as COVID-19 center in Mar 2020 with the facility for critical care monitoring including ABGs, lactate assays, quantitative CRP, ferritin levels, IL-6 levels, Trop I and pro BNP levels being provided round the clock. VTM was prepared in AFIP by Chemical Pathology department and formula for preparation was shared with NIH for onward dissemination to all civilian establishments that consequently saved at least 200 million rupees. More than 225,000 PCR tests have been conducted at Virology department, AFIP (till 31 Dec 2020). In Nov 2020, Rapid antigen testing (RAD) for SARS-CoV-2 was started to facilitate the clinicians. Covid-19 Pandemic can be defeated at national level only by mutual efforts of government and public with the aid of pathology services playing a vital role in establishing association between different bio-markers and Covid-19.

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CC/PSCP-2021-PS1-Lec-002

COVID-19 VACCINATION – PAKISTAN'S PERSPECTIVE

Maj Gen Salman Saleem

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ABSTRACT

The COVID-19 pandemic has been a once in a millennium phenomenon, having adverse effects not only on world health, but also jeopardizing the general well-being, economic growth and normal social behaviors. In order to control this menace, mankind has had to pay a huge price in the form of non-pharmacological interventions which included a tremendous compromise on normal social behaviors and lifestyles. However, the final frontier in this control strategy remains the achievement of herd immunity by way of mass vaccination. Several types of vaccines for COVID-19 prevention have been developed in the past year and some of them have recently been approved by international regulators for human use. Pakistan like most of the developing world, is dependent on a few countries which have developed the vaccines and is in the process of acquiring and implementing national vaccination plan.

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CC/PSCP-2021-PS1-Lec-003

COVID-19 METHOD VALIDATION DURING PANDEMIC: EXPERIENCE OF CAP ACCREDITED LAB

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ABSTRACT

During the initial stages of COVID-19 pandemic in early 2020 there was an increasing pressure on the Clinical Laboratories to initiate patient testing. Performing adequate method validation with many constraints before starting patient testing was an immense challenge faced by clinical laboratories.

Method Validation should be a standard laboratory process, but the process need not be exactly the same for every laboratory or for every method validated by a laboratory. One of main the purpose of method validation is error assessment. Labs should demonstrate that prior to reporting patient test results, it can obtain the performance specifications for accuracy, precision, and reportable range of patient test results, comparable to those established by the manufacturer. The laboratory must also verify that the manufacturer's reference range is appropriate for the laboratory's patient population. For modified methods or high complexity methods, verification of analytical sensitivity and analytical specificity is also required.
Other critical method factors or characteristics, such as cost/test, specimen types, specimen volumes, time required for analysis, rate of analysis, equipment required, personnel required, efficiency, safety, etc., must be considered during the selection of the analytical method.
The approach in method validation is to perform a series of experiments designed to estimate certain types of analytical errors, e.g., a linearity experiment to determine reportable range, a replication experiment to estimate imprecision or random error, a comparison of methods experiment to estimate inaccuracy or systematic error, or interference and recovery experiments to specifically estimate constant and proportional systematic errors (analytical specificity), and a detection limit experiment to characterize analytical sensitivity. The acceptability of these observed errors is judged by comparison to standards of quality, i.e., recommendations for the types and amounts of analytical errors that are allowable without invalidating the medical usefulness of the test results.

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CC/PSCP-2021-PS1-Lec-004

COVID-19: IMPACT ON CLINICAL RESEARCH AND ITS IMPLICATIONS FOR CHEMICAL PATHOLOGY RESEARCH

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ABSTRACT

The COVID-19 pandemic has resulted in unprecedented effects on academia worldwide. The economic plunge induced by COVID-19 has led to redirection of resources. With this financial crisis and temporary halting of in-person visits, studies in various disciplines have been unavoidably constrained. Moreover, this pandemic has affected key study outcomes which

must be considered during data analysis and interpretation. However, the COVID-19 response has also introduced innovations that have advanced our overall conduct of clinical research.

The Chemical Pathology laboratory plays a role in diagnosis, staging, prognosis, monitoring, and epidemiological surveillance of COVID-19. Although the bulk of molecular diagnostic testing for SARS-CoV-2 virus typically falls under the microbiology department, the clinical chemists have been called upon to assist with validating, automating, and expanding previously semi-automated processes. Such scientific coalition will provide platform for new researches. In addition to common chemistry tests such as C-reactive protein (CRP), albumin, lactate dehydrogenase (LD) and procalcitonin, the development and incorporation of new biomarkers for early clinical detection of COVID-19 calls for further research. Institutes should avail this opportunity to assist their postdocs in order to protect the future and diversity of scientific pipeline during this pandemic.

As we navigate through and beyond this pandemic, which will have a long-lasting impact on our world, it is important to recognize and address opportunities and strategies for, and challenges of clinical research and strengthening the research in our specialty.

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CC/PSCP-2021-PS1-Lec-005

LEADING ROLE OF PATHOLOGY LABORATORIES IN CURTAILING THE PANDEMIC OF COVID-19

Brig (R) Prof Aamir Ijaz

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ABSTRACT

Population analysis shows that the cases of COVID-19 has been the lowest in Pakistan as compared to its neighboring countries with similar geographical and economic conditions (2636 cases /million in Pakistan as compared to 8615 cases/million in India, 3312 cases/million in Bangladesh and 3761 cases/million in Siri Lanka). Smart like down has been acknowledged by WHO and other organizations as the most successful strategy adopted by Pakistan. This strategy revolves around closing down of the areas and neighborhoods with higher number of positive COVID-19 cases. PCR has been the mainstay of defining a 'positive COVID-19' case in Pakistan and abroad. So, if we dissect the sequence of events meticulously, we will find out that the role of Pathology laboratories is at the core of this strategy, as these labs not only perform PCRs around the clock but also timely communicate the result to the higher authorities to implement lockdown in

the affected areas. National Institute of Health Islamabad (NIH), which is the largest referral lab in Pakistan acquired the capability of PCR COVID 19 testing as early as March 2020 with the help of our great friend China. Then many Public and Private labs started PCR testing, inspire of the difficulties in procuring equipment and reagents because of the complete shutdown of cargo flights. National Disaster Management Authority (NDMA) helped in making these kits and equipment available to the labs. Labs very effectively upload the positive and negative results in the portals of Federal and Provincial Governments, which lead to the timely and accurate data collection and reporting to the National Command and Operational Centre (NCOC). In Punjab, dashboard named HISDU (Health Information and Service Delivery Unit) provided the role model for other provinces. Pakistan Society of Chemical Pathologists (PSCP) promptly started educational activities for the training of Pathologists and lab staff by carrying out online teaching sessions and conferences. Punjab Healthcare Commission (PHC) controls PCR COVID 19 testing in public and private labs by inspections and allow only those labs to function who adopt proper biosafety measures and use standardized equipment. NIH Islamabad is also conducting an External Quality Assurance Programme for PCR COVID 19 to ensure accurate results.

Up till now (28th Feb 2021) nearly 8.9 million PCR COVID 19 tests have been carried out in Pakistan. However, it is a common notion thar the number tests in Pakistan is very low. Although it is low compared to the testing volume in developed world, we are well above the WHO criteria of 10-30 tests per positive case. Pathology labs also play major role in the monitoring of the COVID-19 patients admitted in hospitals by carrying out routing and biomarkers testing.

Key |Words: PCR COVID 19, Smart Lockdown

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CC/PSCP-2021-PS1-Lec-006

IMPACT OF COVID-19 ON LABORATORY PROFESSIONALS-A CROSS SECTIONAL SURVEY AT A CLINICAL CHEMISTRY LABORATORY IN A LOWER MIDDLE-INCOME COUNTRY

Imran Siddiqui, Zeeshan Ansar Ahmed, Imran Siddiqui, Naveed Haroon Rashid, Maheen Mansoor, Lena Jafri

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ABSTRACT

Background: The lab professionals at one end are at increased risk of contracting the infection while on the other end have to deal with the various challenges during the Coronavirus Disease 2019 (COVID-19) outbreak. This survey was

undertaken to analyze the lab professionals' perspectives, in terms of the challenges, financial implications, fears, motivation and satisfaction from organizational processes and policies adopted, amid the COVID-19 crisis.

Material & Methods: The study utilized a cross-sectional survey design. The survey was administered online via the google docs survey tool from medical laboratory professionals (n=64) serving at the section of Clinical Chemistry, department of Pathology and Laboratory Medicine, the Aga Khan University (AKU), Pakistan from June 4th to 14th 2020. A team consisting of three Clinical Chemistry consultants serving as faculty at the section, designed the survey questionnaire. The responses were recorded on a five-point Likert Scale (1=strongly disagree, 2= disagree, 3=neutral, 4=agree and 5=strongly agree). The statistical analysis was performed using the Microsoft Excel 2013. Frequency and percentages were calculated for gender, experience and designation while descriptive results based on the responses were also recorded.

Results: The response rate was 78% (n=50). 60% responded that the current lifestyle adopted during the pandemic was not better than the traditional one. The fear of employment termination and financial challenges were being faced by 42% and 78% respondents respectively. The quality of family life was improved in 54% cases while 96% were of the view that their social activities at work have suffered. Whereas, 22% were not satisfied by the measures taking by the management during the outbreak.

Conclusion: The findings of this survey provide laboratorians' perspective, in times of such crisis and provides us certain lessons to prepare for such unpredicted situations in future.

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PLENARY SESSION – II

ABSTRACT PLENARY SESSION – II

CC/PSCP-2021-PS2-Lec-007

ROLE OF VITAMIN D IN INFECTION, PROGRESSION AND SEVERITY OF COVID-19

Dr Aysha Habib

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ABSTRACT

The COVID-19 pandemic requires a rapid understanding of the pathogenesis of the spectrum of the disease and factors associated with varied clinical presentations. Immune dysregulation with a cytokine storm (CS) progressing to ARDS with resemblance to sHLH is suggested as a main cause of tissue injury. Low levels of vitamin D were observed in COVID-19 cases with higher incidence of mortality in 20 European countries, increased risk of severity in COVID-19 contributing to ARDS or fulminant myocarditis and micro vascular thrombosis is proposed. Vitamin D may be protective against acute respiratory tract infections, as it regulates the inflammatory cytokine response of respiratory epithelial cells and macrophages, suppress CS and other manifestations seen in SARS-Cov-2. Hence, it is suggested as one of the therapies in SARS-CoV-2 infection. Major research gaps are identified globally in clinical management and this relationship. There is an imperative requisite to understand the interplay of markers in SARS-CoV-2, its risk factors and potential role of vitamin D to improve clinical outcome by pandemic of COVID-19. We therefore perform this review for understanding the pathophysiology of SARS-CoV-2 infections and the role of vitamin D in combating it.

Key Words: COVID-19, vitamin D, pathophysiology of SARS-CoV-2

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CC/PSCP-2021-PS2-Lec-008

EVOLVING ROLE OF RADIOLOGY IN CURRENT PANDEMIC

Brig Saerah Zafar

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ABSTRACT

Radiology has had to face two-fold challenges in the current pandemic: maintaining the protective measures in place to minimise the spread of disease while dealing with the large influx of patients, and to promptly manage the workload given the same space and work force. The response to COVID 19 pandemic had to be quick with no time lapses as it entailed risk of exposure of the disease to the radiology staff and other non COVID patients, hence standard operating procedures (SOPs) were developed according to international standards. Radiology played a vital role in management of COVID patients- centred mainly around High-Resolution CT (HRCT) chest, which not only acts as a prognostic parameter for COVID 19 pneumonia but is also being considered as a diagnostic tool in majority of the patients.

Aim of this presentation is to highlight the evolution of imaging in COVID 19 patients, with emphasis on preparedness regarding protective measures for both staff and patients within the Radiology department in case of pandemics.

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CC/PSCP-2021-PS2-Lec-009

NEQAPP: ROLE OF CLINICAL CHEMISTRY PROFICIENCY TESTING SCHEME IN QUALITY ASSESSMENT OF MEDICAL LABS IN PAKISTAN

Brig Muhammad Aamir, SI(M)

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ABSTRACT

Over the last three decades the workload of clinical laboratories has immensely increased as clinicians rely heavily on laboratory data for diagnosis, treatment and prognosis. This dependency leads pathology to widen its scope of laboratory tests repertoire with the blessings of technological advancements and increased pressure on laboratories to produce error free results. Clinical and Laboratory Standards Institute (CLSI), International Standard Organization (ISO) and American College of Pathologists (CAP) are standardization bodies that have laid down standards, procedures and policies to

implement quality standards in all three phases of a laboratory. The common primary quality obligations suggested by these organizations are internal quality control (IQC) and participation in proficiency testing schemes of external quality assessment programme (EQA). An EQA programme consists of different or a single proficiency testing (PT) scheme(s) that involves planned distribution of test materials over a specific period of time to participating laboratories. The participating laboratories return results to the EQA organizer. EQA organizer performs statistical analysis and evaluation of the results and generates reports for the participants. It helps the participating laboratories to know the deficiencies in their test procedures.

NEQAPP clinical chemistry proficiency testing scheme is based on inter-laboratory comparison according to the guidelines of ISO 17043:2010 standard. Peer groups are formed according to the laboratory's analytical methods and analyzers. Successful participation in NEQAPP recognized as an objective evidence of competence for participating laboratories, accrediting bodies and regulatory agencies. Results of 146 clinical labs for last 10 consecutive rounds were analyzed. Data of twenty-five parameters of clinical chemistry was retrieved from archives. Participation and performance of different labs was assessed, keeping the identity of participants concealed.

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CC/PSCP-2021-PS2-Lec-010

A PANDEMIC: CHALLENGES IN DIAGNOSIS

Brig Eijaz Ghani

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ABSTRACT

Molecular diagnosis of COVID-19 primarily relies on the detection of RNA of the SARS-CoV-2 virus, the causative infectious agent of the pandemic. Reverse transcription polymerase chain reaction (RT-PCR) enables sensitive detection of specific sequences of genes that encode the RNA dependent RNA polymerase (RdRP), nucleocapsid (N), envelope (E), and spike (S) proteins of the virus. Although RT-PCR tests have been widely used and many alternative assays have been developed, the current testing capacity and availability cannot meet the unprecedented global demands for rapid, reliable, and widely accessible molecular diagnosis. Challenges remain throughout the entire analytical process, from the collection and treatment of specimens to the amplification and detection of viral RNA and the validation of clinical sensitivity and specificity. We highlight the main issues surrounding molecular diagnosis of COVID-19, including false negatives from the detection of viral RNA, temporal variations of viral loads, selection and treatment of specimens, and limiting factors in

detecting viral proteins. We discuss critical research needs, such as improvements in RT-PCR, development of alternative nucleic acid amplification techniques, incorporating CRISPR technology for point-of-care (POC) applications, validation of POC tests, and sequencing of viral RNA and its mutations. Improved assays are also needed for environmental surveillance or wastewater-based epidemiology, which gauges infection on the community level through analyses of viral components in the community's wastewater. Public health surveillance benefits from large-scale analyses of antibodies in serum, although the current serological tests do not quantify neutralizing antibodies. Further advances in analytical technology and research through multidisciplinary collaboration will contribute to the development of mitigation strategies, therapeutics, and vaccines. Lessons learned from molecular diagnosis of COVID-19 are valuable for better preparedness in response to other infectious diseases. Tremendous progress has been made in molecular diagnosis of COVID-19, with many assays developed in a very short time. However, the current capacity of testing cannot meet unprecedented global demand for rapid molecular diagnosis. Several areas of research are needed, from resolving the issues of false negative results to the development and validation of faster and easy-to-implement diagnostic assays.

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CC/PSCP-2021-PS2-Lec-011

DEVELOPMENT AND VALIDATION OF STANDARD AND REAL PATIENT GALLSTONE LIBRARY USING FOURIER TRANSFORM INFRA-RED SPECTROSCOPY

Lena Jafri, Muhammad Abbas Abid, Aysha Habib Khan, Bilal Hashmi, and Humera Asif

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ABSTRACT

Introduction: In Pakistan, the diagnostic facilities for assessing the composition of gallstones are primitive. Fourier Transform Infra-Red (FTIR) Spectroscopy is the method used in the developed countries for quick, cheap and accurate analysis of gallstones. The FTIR method determines the composition of the stone and the results are compared to an already developed and validated library for confirmation and categorization. Unfortunately, no commercially available library is present for gallstones neither does any such library exist for Pakistan hence, the method cannot be made functional for use with gallstones. We aim to develop and validate a Gallstone Standard Library for the analysis of gallstones using FTIR Spectroscopy.

Material and Methods: The study was conducted at the Section of Chemical Pathology, Department of Pathology & Lab Medicine, Aga Khan University. The study was conducted in 3 phases. In phase 1 the standards of cholesterol, calcium

carbonate, bilirubin and bile salts from Sigma-Aldrich Corporation, USA were used for developing the Gallstone Standard Library using Nicolet iS5 Spectrometer from Thermo Fisher Scientific, USA. Each standard was run 20 times on the FTIR for precision measurement of the standard spectra. In the second phase patient samples received during the last 5 years from May, 2015 to November, 2020 were analyzed against the FTIR standard library developed in phase one. Thermo Scientific™ Q Check™ algorithm, embedded within the OMNIC software was used to identify the unique spectral fingerprint of the patient samples to match with known, standard material. Matching of >75% was taken as acceptable. In phase three 20 gallstones analyzed at AKU were sent to Mayo Clinic Lab, Rochester, USA as external proficiency testing to check for the accuracy of the created library.

Results: Unique spectral fingerprint for 126 patients was analyzed. Concerted search analysis was performed against the developed Gallstone Standard Library consisting of 71 “pure component” spectrum. Gallstones in the Gallstone Standard Library were classified into 5 types, including cholesterol, bile salt, calcium, bilirubinate, and mixed. Mixed stones were further divided into 11 subtypes, based on percentages of the different constituents. Out of 126 samples studied, 8 were pure cholesterol stones, 106 stones were mixed, with cholesterol as the major component in 81 samples. 6 stones were pure cholesterol, 5 were pure bile salt, while 9 stones failed to match any category. The results of the developed library were 100% in agreement with the reports received from Mayo Clinic Lab.

Conclusion: The library developed displayed good consistency and can be used for detection of gallstone composition in Pakistan and can replace wet chemistry for gallstone analysis.

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CC/PSCP-2021-PS2-Lec-012

SEROPREVALENCE OF SARS-COV-2 ANTIBODIES AMONG HEALTHY BLOOD DONORS IN KARACHI, PAKISTAN

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ABSTRACT

Background and Objective: Covid-19 spread through blood transfusion has not yet been reported. Despite the prevailing pandemic, there are no recommendations available as yet for testing SARS-CoV-2 antibodies as part of blood screening To determine the seroprevalence of SAR-CoV-2 antibodies, its clinical significance and to identify if total antibodies (IgA, IgM, IgG) should be tested or just the specific IgG antibodies only.

Methods: Consecutive blood donors donated were screened for standard serological panel of HbsAg, Anti-HCV, Anti-HIV, Syphilis and Malaria using Cobas-e411 analyser by using Electerochemiluminence assay (ECLIA). All seronegative donors were then screened for COVID serology (total antibody) using the same instrument. These results were compared with the blood donors' seroprevalence checked in a cohort in the first week of June 2020. Pre-COVID-19 period (October 2019) blood donors' archived samples were also compared. Donors who were positive on ECLIA were then tested for specific antibodies (IgM or IgG) by ELISA.

Results: A total of 380 healthy blood donors were included with mean age was 30.6 ± 6.3years. Ten samples from October 2019 were checked for anti-SARS-CoV antibodies by ECLIA, and none of them was found to be positive. In 3rd week of June, 70 donors were tested for presence or absence of anti SARS-CoV antibodies and 15 were tested positive (21.4 %). In July 2020, we tested 300 healthy blood donors, 113 donors (37.7 %) were found to be reactive for anti-SARS-CoV-2antibodies.To reconfirm our findings, these 128 donors were then tested on ELISA for presence of IgG specifically. Out of these 128 samples, 81 were IgG positive, 24 were negative and 23 were found to be borderline positive. To further assess our findings, 24 negative IgG samples were tested for IgM ELISA and out of these 24, 22 were found to be negative for IgM whereas 2 were borderline positive. we found109 blood donors were O Rh D positive, 103 were B Rh D positive whereas 118 were A Rh D positive while the remaining were AB RhD positive and A, B, O and AB Rh D negative. The 31.1 % O RhD positive donors were found to have anti-SARS-CoV-2 antibodies whereas 36.4 % of B positive donors had COVID antibodies.33.05 % of A Rh D positive donor were tested positive for antibodies. No significant association was noted with either of blood groups with SARS CoV antibodies.

Conclusions: Conclusion: Almost 40 % of blood donors are now seroconverted for COVID-19. This is a reflection of widespread seroprevalence in the adult male population. seroprevalence of SARS-COV-2 antibodies has increased in Pakistan over a period of time and could help in recognizing the actual number of COVID-19 cases

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PLENARY SESSION – III

ABSTRACT PLENARY SESSION – III

CC/PSCP-2021-PS3-Lec-013

ROLE OF PROCALCITONIN IN DIAGNOSIS OF SEPSIS

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ABSTRACT

Sepsis is an important public health issue globally. Despite advances in modern medicine, over 5.3 million people die annually from sepsis, at an estimated overall mortality of 30%, Sepsis is defined as "life- threatening organ dysfunction caused by a dysregulated host response to infection". It is a spectrum of disease that ranges from minor signs and symptoms through to organ dysfunction (severe sepsis) and shock. The mechanism of sepsis is complex; Macrophages phagocytose and bacteria produce a range of proinflammatory cytokines, which initiate the innate immune system's response to the bacterial pathogen. This result in the production of interleukin (IL)-1β, tumor necrosis factor (TNF) and IL-6. inflammatory cytokines like Tumor Necrosis Factor-alpha (TNFα) and Interleukin-6 (IL-6) act on the vascular system of the body and leads to clinical signs of sepsis.

Diagnostic suspicion of sepsis are based on the clinical findings and blood count which includes two or more of the following; temperature > 38.3°C or < 36°C, heart rate more than 90 beats/min, respiratory rate more than 20 breaths/min or $PaCO_2$ more than 32mmHg, White Blood Cell (WBC) Count >12000/mm ^{3} or <4000/mm ^{3} or ≥10% immature neutrophil in peripheral blood.

The progress of sepsis is very rapid from mild symptoms to severe sepsis and septic shock. For better outcome and to reduce morbidity and mortality, early diagnosis is important. Absolute neutrophil count, blood culture, C-reactive protein (CRP), IL- 6, IL-8 and lactate has been used as markers of sepsis. Blood culture remains the gold standard test for diagnosing sepsis, but it has some inherent limitations. It takes at least 3-5 days to be conclusive after blood sample collection and also availability of a well-developed microbiology laboratory. Blood culture may be falsely negative due to prophylactic use of antibiotic. To overcome these problems, certain newer markers are now being used for the diagnosis of neonatal sepsis. Among them, PCT has very strong association with bacterial sepsis.

PCT is 116 amino acids chain protein with plasma half-life of 20-24 hours. It is normally secreted by neuroendocrine cells of the thyroid gland, lungs and pancreas. In sepsis, it is synthesized by macrophages and the monocytic cells of liver. It is proposed that PCT causes chemotaxis of monocytes which leads to nitric oxide production and release of cytokines. PCT levels in healthy people are less than 0.046 ng/ml. PCT levels increases in blood 2-4 hours after the onset of sepsis; it reaches its peak levels within 24 hours and gradually decreases with proper management of case.

A study was conducted in Ziauddin Hospital, Karachi, Pakistan to see the diagnostic effectiveness of PCT as a biomarker for early diagnosis of neonatal sepsis before final diagnosis is being made through the blood cultures, so that if the sepsis in neonates is diagnosed early in the course of disease it will help in its early empirical treatment, and monitoring hence decreasing the complications of neonatal sepsis. Out of 171 clinically diagnosed case of neonatal sepsis, 86 (50.3%) were confirmed as neonatal sepsis (blood culture positive) while 85 (49.7%) had negative blood culture results. There was a significant difference in serum PCT levels in both the groups. The diagnostic accuracy of PCT as an early biomarker of neonatal sepsis, had sensitivity of 97.7%; specificity of 70.6%; PPV of 77.0%; NPV of 96.8%; Likelihood ratio of a Positive Test (LR+ve) is 3.32, Likelihood ratio of a Negative Test (LR -ve) is 0.03 and cumulative diagnostic accuracy of PCT 84.2%. It was concluded that PCT is a very useful biomarker for the early diagnosis of neonatal sepsis. Using this biomarker can help making early clinical decisions regarding management of the patients.

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CC/PSCP-2021-PS3-Lec-14

NGS- A GRANARY OF INFORMATION ON TRACKING TRANSMISSION AND ANALYZING GENOMIC VARIATION

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ABSTRACT

‘‘SARS-CoV2’’, a previously unknown strain of corona viruses caused a severe respiratory disease called Corona virus disease (COVID-19) which emerged from Wuhan city of China on 30th December 2019, and declared as Global health problem by World Health Organization within a month. Confirmed detection of the virus followed by isolation of the infected person at the earliest possible is the main measure to prevent this disease. Although there are number of methods available for detection of virus and to combat this disease in the present pandemic situation, but these available diagnostic

methods have their own advantages and limitations. This talk is mainly focused on utility and applications of Next generation sequencing (NGS) in present pandemic.

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FREQUENCY OF METABOLIC DERANGEMENTS IN COVID-19 PATIENTS

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ABSTRACT

Introduction: COVID-19 is a viral disease which affects individuals due to the Severe Acute Respiratory Syndrome Virus (SARS-COV-2). It has been declared a global pandemic by WHO. We have tried to assess the biochemical parameters in these patients to determine which of these parameters are affected by the virus.

Materials and Methods: A total of 107 adult patients who tested positive for COVID-19 by Rt-PCR were included in the study. The age range was between 15-90 years. We determined Urea, Creatinine, Chloride, Sodium, Potassium, Bicarbonate, Ferritin, Lactate Dehydrogenase (LDH), Calcium, Magnesium, Phosphorus levels of these patients to assess the abnormalities. Data was analyzed using SPSS version 25.

Results: Out of a total of 107 patients between the age range of 15-90 years, 69 (64.5%) were males and 38 (35.5%) were females. The mean age was 56.6 years. The frequency of abnormalities of the different parameters, Urea, Creatinine, Ferritin, LDH were all increased in 33.6%, 22.4%, 88.8% and 93.5% of all the patients. Electrolytes (Chloride, Sodium, Potassium) showed an abnormal increase in 3.7%, 2.8% and 1.9% patients respectively, whereas a decrease was seen in 8.4%, 44.9% and 22.4% respectively. Low levels of Bicarbonate were seen in 53.35% of patients. As regards Calcium, Magnesium and Phosphorus, high levels were seen in 0.9%, 2.8% and 8.4% respectively. Low levels were seen in 48.8%, 11.2% and 23.4% respectively. The abnormalities of these parameters were also studied after grouping the patients into different ages viz ≤40 years, 41-50 years, 51-60 years and >60 years.

Conclusion: COVID-19 patients had many metabolic derangements and these should be studied in more detail especially regarding renal function and electrolyte imbalance.

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COPEPTIN – A NEW MARKER OF INTEREST

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ABSTRACT

Potential of copeptin measurement as a surrogate marker of AVP/ADH secretion for the direct diagnosis. A 39 amino acid glycoprotein found on the C-terminal portion of pro-Arginine Vasopressin precursor hormone. The rising popularity of copeptin as a surrogate marker for vasopressin is due to laborious assay and presumed limited ex vivo stability of vasopressin in comparison with copeptin. Copeptin underlies a circadian rhythm of minor extent and in only some individuals. Copeptin has been used to evaluate the role of vasopressin in pathophysiology. Its measurement proved to be useful as a novel approach for diabetes insipidus (DI) diagnosis. Levels were increased, especially in patients with sepsis, shock, heart failure, and respiratory distress. Copeptin is shown to be superior to CRP in distinguishing the population of patients diagnosed with septic shock from those diagnosed with sepsis. Several studies highlighted the role of copeptin as prognostic factor of increased risk in sepsis and septic shock have also been published. Early measurement of plasma copeptin could provide better prognostic information for patients with acute stroke and help in decision making for therapeutic interventions. It is released very early during the onset of an acute myocardial infarction (AMI) raising the question of its potential value in the diagnosis of AMI and particularly in ruling-out AMI.

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CHALLENGES, SUCCESS FACTORS AND OUTCOME OF TEACHING AND LEARNING VIA VIRTUAL LEARNING ENVIRONMENT (VLE) IN COVID-19 PANDEMIC

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ABSTRACT

Teaching in the COVID-19 pandemic is a huge challenge, but with it comes many opportunities. However, virtual or online teaching takes much preparation. The first COVID-19 case was diagnosed on February 26th, and governments closed all

educational institutes across Pakistan. All on-site teaching activities were suspended, and educators started planning to shift to virtual learning platforms. These were challenging times for both students and faculty. A nursery class student to undergraduate medical students and postgraduate university fellows had to take online classes. These were challenging times for both students and faculty.

This "forced" online learning has its issues! While learning still goes on, it does not consider that the online teaching and learning are highly dependent on the availability of resources, the hardware and software; training and preparation.

The "crisis" has altered the teaching calendar and assessments. Alternatives have had to be devised to accommodate missed assignments that would take place during the shutdowns! Virtual learning approach is a revolutionary step in the current set up of traditional teaching. These are challenging time, and the need for flexibility and creativity will and are key to successfully getting through the "crisis"!

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EARLY DIAGNOSIS OF CORONARY ARTERY DISEASE BY MICRO RNA PANEL IN PATIENTS WITH ANGINA

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ABSTRACT

Coronary artery disease (CAD) is a narrowing or blockage of the arteries due to the atherosclerosis. Atherosclerosis in coronary arteries is caused by endothelial cells (ECs) dysfunction, cholesterol uptakes, inflammation and vascular smooth muscle cell (VSMC) proliferation. The prevalence of CAD in the World and Pakistan is 10–15 % and 17-29% respectively. CAD can be classified into myocardial infarction (MI), unstable angina (UA) and stable angina (SA) according to the severity of disease. The diagnosis of MI can be done by ECG and raised troponins. However, the early diagnosis of atherosclerosis in the patients with UA and SA is challenge and based on clinical history.

The assessment of blockage of coronary arteries due to atherosclerosis in these patient's diagnosis require invasive technique of angiography and calculation by Gensini score (GS). Normal coronary arteries may be found on angiography in approximately 9 – 15 % patients of chest pain, although this percentage may vary from hospital to hospital. Currently

diagnosis of CAD in patients with angina is confirmed by angiography, which is invasive and not easily available in secondary/ tertiary care hospitals. Therefore, it is a need of hour to establish non-invasive biomarker for early diagnosis of CAD in the patients with angina.

Micro RNA (miRNA) is small non-coding RNA of 18-22 nucleotides which may be dysregulated in the atherosclerosis. Thus, miRNA can be used as the non-invasive biomarker for early diagnosis and severity of atherosclerosis in patients with angina. Normal miRNA may also rule out healthy subjects presented with atypical chest pain. It is mandatory to diagnose angina at an early stage in order to avoid MI and cardiac complications. miRNA panel (miRNA-21, miRNA-33a, miRNA-133a, miRNA-145 and miRNA-146a) can be used for the early diagnosis of CAD in patient with angina.

Micro RNA-21 expression is increased in ECs dysfunction, this miRNA causes induction of angiogenesis and repair mechanism. This is also involved in VSMC proliferation, inflammation-based atherosclerosis, insulin insensitivity, inhibition of apoptosis, proliferation and survival of fibroblasts. The diagnostic accuracy of miR-21 via receiver operator characteristic (ROC) curve showed area under curve (AUC) 0.867 (0.7913 to 0.9417 at 95% CI, $p < 0.0001$) for acute coronary syndrome (ACS) vs healthy subjects and 0.7801 (0.67–0.89, at 95% CI, $p < 0.0001$) for SA vs healthy subjects. miRNA-33a is found up regulated in atherosclerotic cardiovascular diseases. It is involved in the initiation of atherosclerosis and progression by lipid metabolism, insulin signaling and glucose homeostasis, cell type progression, proliferation, and myeloid cell differentiation. miRNA-33a AUC was 0.799 (cutoff value: 9.91), sensitivity 72% and specificity 0.67%. Elevated miRNA-133a is released into peripheral circulation from ischemic myocardium. miRNA-133a found as a predictor marker of significant coronary stenosis with cut off value = 4.56, AUC = 0.90, specificity 92 % and sensitivity 86 % in ACS patients. miRNA-145 inhibits the abnormal proliferation of VSMCs. The decrease in plasma miRNA-145 can be useful marker in prediction, progression and severity of CAD. ROC curve constructed using the serum expression levels of miR-145 revealed that decreased expression of miR-145 had relatively high diagnostic accuracy with an AUC of 0.852 and the sensitivity 83.8% and specificity 82.5% at cut of value of 5.600. miRNA-146a is expressed in vascular endothelial cells, monocytes/macrophages, smooth muscle cells and regulates the development of atherosclerosis by acting on different target genes especially that regulates the inflammatory response. miRNA-146a is over expressed in atherosclerosis. For the diagnosis of coronary heart disease, AUC of miR-146a was 0.779 (95% CI 0.711-0.848; $P<0.001$). Individual microRNA studied in the pathogenesis of atherosclerosis has its unique role in CAD.

Cardiac panel of micro RNA involved in the complete pathogenesis of atherosclerosis can be used for accurate diagnosis of CAD is still under trial. Most of the studies conducted in Pakistan are epidemiological. Only a few biochemical markers have been tested and no data available on the miRNA cardiac panel for CAD in patients with angina. The researchers have done several studies by using different miRNA for diagnosis of CAD, and dysregulation of few miRNA is found in different studies

that reported controversial results. Up till now no non-invasive biochemical marker exists in practice for the diagnosis of angina.

Cardiac panel of micro RNA (miRNA-21, miRNA-33a, miRNA-133a, miRNA-145 and miRNA-146a) should be used after validation in comparison to angiography, for early and accurate diagnosis of CAD in patients with angina. The cardiologists and physicians can get early diagnosis of angina by the miRNA panel that can help to manage their patients cost effectively. Clinical labs are available in almost every tertiary care hospital, where facility for analysis of miRNA should be established.

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SECTION-2
SCIENTIFIC SESSION-I

ABSTRACT PLENARY SESSION – I

CC/PSCP-2021-SS1-Lec-001

CORRELATION OF BLOOD GLUCOSE LEVELS WITH BIOCHEMICAL AND HEMATOLOGICAL ABNORMALITIES IN DIABETIC AND NON-DIABETIC COVID 19 PATIENTS - EXPERIENCE FROM A TERTIARY CARE HOSPITAL OF QUETTA

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ABSTRACT

Patients with serious toxic ingestion and other forms of poisoning are frequently admitted to ICUs, either because they are critically ill or have the potential for rapid deterioration of their condition. It is very important to recognize the particular constellation of clinical findings, the toxidromes, in these patients and then to subsequently carry out screening lab tests in order to come up with a plausible diagnosis in an emergent/critical setting as early recognition of intoxication can be key to a favourable outcome for the patient. Screening tests include simple visual color tests (spot tests) and immunoassays that are designed for rapid and qualitative detection of drugs and other toxic substances. Because of the wide variety of drugs, it is prudent to test for drugs that are most commonly used locally while also taking into consideration the available resources of the lab. Screening tests have adequate clinical sensitivity but lack specificity. Moreover, these tests may not detect the offensive toxin/drug as these agents may not be part of test repertoire of the testing lab. This presentation aims to highlight the limitations of screening tests as certain pitfalls may be encountered in interpreting them. For example, a negative result may mean the absence of the offending toxin from the test repertoire or rule out with reasonable certainty the presence of clinically significant concentration of a particular analyte that is part of the test menu. At the same time, a positive test may be attributable to interfering substances and therefore, should be confirmed by an alternate procedure of greater specificity.

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DEVELOPMENT OF A VIRTUAL CLASSROOM FOR PRE-ANALYTICAL PHASE OF LABORATORY MEDICINE FOR UNDERGRADUATE MEDICAL STUDENTS USING THE DELPHI TECHNIQUE WITH CHEMICAL PATHOLOGY EXPERTS DURING THE COVID-19 PANDEMICROLE

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ABSTRACT

Background: Pre-analytical phase of laboratory medicine is the most error-prone. Knowledge gaps are identified amongst undergraduate students due to lack of formal teaching regarding the pre-analytical phase. This study was conducted to seek experts' consensus in Clinical Chemistry on learning objectives using the Delphi technique and to develop a virtual classroom for pre-analytical factors of laboratory testing during the COVID-19 pandemic.

Methods: A mixed-method study was planned at the Section of Clinical Chemistry, Department of Pathology & Laboratory Medicine, Aga Khan University. Based on literature search, a questionnaire was developed on Google-Docs. A four-point Likert-Scale was utilized for learning objectives. An open-ended question was included for experts to suggest items for inclusion. A cut-off of 75% agreement was set for consensus. Seventeen Chemical Pathology faculty from 13 institutions across Pakistan were invited to participate in the Delphi process as 'experts.' Later, the agreed-upon objectives and triggers were used to develop interactive scenarios over Moodle to concurrently test-and-teach medical students in a nonchalant manner.

Results: Seventeen responses were received for the Delphi process (response rate = 100%). In round 1, all 16 learning objectives reached consensus ($\geq$75%). Out of 75 triggers in round 1, 61 (81.3%) reached the consensus while 39 were additionally suggested. In round 2, 17 out of 39 newly suggested triggers reached consensus. 14 triggers were eliminated due to failure to reach consensus after 2 rounds. The interactive virtual classroom developed consisted of 20 items with a total score of 29 marks. The questions included multiple-choice-questions, drag-and-drop-sequences and comprehensions. Learning-points were included after each item and graphs and pictures were included for vibrancy.

Conclusion: We developed an effective and interactive virtual session with expert consensus on the pre-analytical phase of laboratory testing for undergraduate medical students which can be used for medical-technologists, graduate-students and fellows in Chemical Pathology.

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EVALUATION OF ADJUSTED CALCIUM LEVELS IN PATIENTS OF CHRONIC RENAL FAILURE WITH HYPO-ALBUMINEMIA

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ABSTRACT

Objective: To compare adjusted calcium levels with ionized calcium in Chronic renal failure (CRF) patients with hypo albuminemia for correct assessment of their calcium status

Study Design: Cross sectional study

Study Place and Duration: Department of Chemical Pathology and Endocrinology, Armed Forces Institute of Pathology, Rawalpindi from March 2020 to March 2021.

Materials and Methods: A total of 304 individuals between the ages of 18 to 90 years belonging to both genders were included in the study. Participants were differentiated into different stages of Chronic renal failure on the basis of estimated glomerular filtration rate (eGFR) calculated through Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) using their age, gender, ethnicity and serum creatinine concentration. Total serum calcium was measured by Arsenazo III method, serum albumin and creatinine levels were analysed using bromocresol purple method and modified jaffe reaction respectively on ADVIA 1800^{R} Clinical Chemistry Auto analyser. Ionized calcium (iCa) was analysed on Cobas b221 ABGs and electrolyte analyser using direct ISE technique. Data was analysis was done on SPSS version 21.

RESULTS: Results showed that mean age of the study participants was 56.3±16.03 yrs. Out of the 304 total participants 218(71.7%) were males and 84(21.6%) were females. Majority of the study population had stage 5 (42.5%) and stage 4 (33.3%) CKD. On the basis of iCa-concentration 37.3% participants had hypocalcaemia, 57.2% were normocalcaemic and only 4.9% had hypocalcaemia. 14.7% had albumin concentration less than 20 g/L, 57.5% had albumin concentration between 20-29 g/L and 27.1% had albumin levels from 30-39 g/L. Chi-square analysis showed significant association between total calcium status and iCa status of patients at different levels of albumin concentrations with p value less than 0.05 but adjusted calcium levels didn't not show significant association with iCa status in CRF patients with hypoalbuminemia.

CONCLUSION: It was concluded that adjusted calcium levels based on modified payne formula tends to overestimate the correct calcium status in patients of CRF with hypoalbuminemia.

Key Words: Chronic Renal Failure, CKD-EPI, eGFR, Hypoalbuminemia, Adjusted Calcium, Ionized calcium, Chronic Kidney Disease

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CLINICAL EVALUATION OF MULTIPLE SEROLOGICAL DIAGNOSTIC ASSAYS FOR DETECTION OF ANTIBODIES IN COVID-19

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ABSTRACT

Background: To cope up with the emergency situation of COVID-19, United States Food and Drug Administration issued relaxed regulatory guidelines to use SARS-CoV-2 serological assays like Immunofluorescence Assay (IFA), ELISA, electrochemiluminescence and chemiluminescence immunoassays. It is now the duty of clinical laboratories to validate these assays appropriately to determine whether theses assays perform accurately according to manufacturer's claims. This study is aimed to detect the clinical performance of three different serological assays to detect COVID-19 Antibody.

Material and Methods: It was a cross sectional study conducted at Chughtai Institute of Pathology from 01st April to 30th May 2020. Blood samples were collected from 75 adult male and female patients, 25 were pre pandemic samples and 50 were diagnosed cases of COVID-19 in whom sample was taken 21 days post symptom onset. All samples were analyzed to detect the presence or absence of COVID-19 IgG antibodies using IFA, ECLIA and CMIA. SPSS 23.0 and EP evaluator were used to assess sensitivity, specificity and Cohen's kappa.

Results: IFA showed the lowest sensitivity and specificity followed by CMIA and ECLIA.

Conclusion: Detection of anti-SARS-CoV-2 antibodies may act as a reliable diagnostic tool provided the assay is properly validated before use. Chemiluminescence immunoassay prove to be a better serological assay as compared to Electrochemiluminescence and Immunofluorescence assay.

Key Words: SARS-CoV-2, serological assays, Chemiluminescence, Electrochemiluminescence, Immunofluorescence immunoassay.

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CC/PSCP-2021-SS1-Lec-005

EVALUATION OF ZINC LEVELS IN PATIENTS OF CKD

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ABSTRACT

Objective: To evaluate zinc deficiency among CKD patients in a tertiary care hospital.

Methods: This observational cross-sectional study was conducted at the Department of Chemical Pathology and Endocrinology, Armed Forces Institute of Pathology, Rawalpindi from Jan 2020 to Jun 2020 after approval from the Ethical Committee of the Institute. The data was entered & analyzed using SPSS version 21.0. Serum Zn levels was expressed as Mean ± SD.

Results: Study included total of 120 patients with mean age of 60 years. The patients were divided into five subgroups, stages 1-5, according to their eGFR values. The mean value of serum zinc level in CKD patients was 9.03 ± 2.51 µmol/L. The levels of serum zinc showed a statistically significant difference (p Z 0.005) at different stages and a significant decreasing trend in late-stage CKD subjects.

Conclusion: This study presents serum zinc concentration in various stages of CKD. The results here show that there is significant difference in serum levels of this element among different stages of CKD. In this study we found an increasing tendency of serum zinc deficiency in ascending stage groups of CKDs.

Key Words: Atomic absorption spectrometry, CKD stages, Serum zinc.

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CROSS REACTIVITY OF COVID-19 IGG ASSAY WITH KNOWN IMMUNE MEDIATE DISORDERS

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ABSTRACT

Objective: To assess the Cross Reactivity of COVID-19 IgG assay with known immune mediated disorders and to evaluate the specificity of the serological assay.

Study design: Cross-Sectional Analytical Study
Place and duration of study: Department of Chemical Pathology, Chughtai Institute of Pathology, Lahore, from 10 September 2020 to 15 October 2020
Methodology: A total of 116 samples were included in the study of both adult males and females. Diagnosed cases of Typhoid fever, Viral Hepatitis, Systemic Lupus Erythematosus (SLE), Syphilis, Multiple Connective Tissue Disorders (MCTD), Varicella Zoster, Rabies, Toxoplasmosis, Epstein bar Virus (EBV) infection, Rubella, Rheumatoid Arthritis, AIDS, Cytomegalovirus (CMV) infection and Dengue fever were included in the study. Three samples of multiparous women aged more than 40 years were also included. IgG antibody levels were measured against SARS-CoV-2 with a cut off index of 1.4.
Results: Out of 116 samples, only 3 samples were reactive for IgG against SARS-CoV-2. The categories showing cross reactivity were Typhoid, Hepatitis C and CMV. All the three specimens showing cross reactivity were of females.
Conclusion: Cross reactivity was seen in pre pandemic cases of infectious diseases with COVID-19 IgG antibody assay. Medical lab professionals must verify the serological assays before use in clinical laboratory to avoid false positive results.
Key Words: Cross reactivity, IgG antibody, COVID-19, SARS-CoV-2, Serology.

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COMPARING THE EFFECT OF HYPOALBUMINEMIA ON SODIUM MEASURED BY INDIRECT VERSUS DIRECT ION SELECTIVE ELECTRODE METHOD

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ABSTRACT

Objective: To evaluate the effect of low serum Albumin levels on serum Sodium measurement when analyzed by Indirect Ion Selective Electrode (ISE) method and to compare the results with Direct Ion selective electrode (ISE) method.
Study design: A cross sectional study
Place and Duration of Study: The study was conducted in the Department of Chemical Pathology, Armed Forces Institute of Pathology from January to March, 2020.
Methodology: Patients of either gender having age between 18 to 70 years who were admitted in Intensive Care Unit of Combined Military Hospital, Rawalpindi were selected. 200 blood samples were collected in gel tube. The samples were

centrifuged at 3500 rpm for 3 minutes to separate serum. Albumin and Sodium concentration were analyzed on all samples within two hours of sample collection. Sodium levels were measured concurrently by both Direct and Indirect Ion Selective Electrode method. The difference of results between these two techniques was studied.

Results: Hypoalbuminemia was detected in 88% (176) of patients while 12% (24) of patients had normal Albumin levels. In Hypoalbuminemic patient's serum Sodium measurements were higher using Indirect ISE method (134.07 ±5.5) compared to Direct ISE method (130.95 ± 3.2). The difference between two techniques was statistically significant (P value < 0.001). There was symmetrical increase in differences between both methods as the level of albumin decreased in patients. 18% (36) patients who were actually Hyponatremic were classified as Normonatrmic when analyzed on Indirect ISE method.

Conclusion: The Indirect ISE method gave false high results of serum Sodium in Hypoalbuminemic patients and the difference between Indirect and Direct ISE method measurements increased as the level of albumin decreased in patients. Hypoalbuminemia status has been associated with critically ill patients and mortality across numerous clinical settings. In view of current pandemic of COVID 19, various studies have also documented the presence of hypoalbuminemia in severe cases of COVID 19. In such patient's serum Sodium measurement by Indirect ISE method will result in significant misclassification of electrolyte status. In such patients, Direct ISE method offers more accurate and consistent electrolyte results than does Indirect ISE.

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DETERMINATION OF DIAGNOSTIC ACCURACY OF BIOCHEMICAL PARAMETERS (CRP, LDH, FERRITIN) IN THE DIAGNOSIS OF COVID-19 IN SUSPECTED COVID CASES

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ABSTRACT

Background: Covid 19 virus is an RNA virus that causes a respiratory illness called Corona Virus Disease-2019(Covid-19**).** Clinical features of COVID-19 extend from asymptomatic infection to severe pneumonia and even death. Person to person transmission occurs via respiratory droplets. Early identification of infection and timely isolation and management is crucial to control the disease. The Reverse transcriptase Polymerase Chain Reaction (RT-PCR) is most commonly used for diagnosis of COVID-19. The disease has been found to be associated with rise in certain biochemical markers like C- Reactive Protein (CRP), Lactate Dehydrogenase (LDH) and Ferritin.

Objective: To determine the diagnostic accuracy of the LDH, CRP & Ferritin in suspected patients of COVID-19.
Materials & Methods: A cross-sectional study was conducted in Pathology department of Combined Military Hospital (CMH) Lahore from 1st May 2020 to 31st May 2020. We included 101 suspected COVID-19 patients. Age, gender and results of RT-PCR, LDH, CRP, Ferritin were recorded.
Results: LDH had highest sensitivity (75%) with a positive predictive value of 71.6% among three biochemical parameters studied. Receiver Operator Characteristic (ROC) curve was studied. Area under curve (AUC) of LDH (AUC= 0.656) and Ferritin (AUC= 0.595) reflected their ability to prognosticate the presence of COVID-19 disease. However, CRP (AUC= 0.42) appeared to be a poor predictor of the disease.
Conclusion: Raised serum LDH (> 490 U/L) and Ferritin (>152 ng/L) levels can be used to predict the RT-PCR positivity in the population of suspected patients of COVID-19. However, CRP is a poor predictor of COVID-19.
Key Words: COVID-19, Lactate Dehydrogenase (LDH), C-Reactive Protein (CRP), Ferritin, Diagnostic accuracy, Reverse Transcriptase Polymerase Chain Reaction (RT-PCR).

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BASELINE PROCALCITONIN (PCT) FOR ANTICIPATION OF SEVERITY AND MORTALITY IN A SET OF PATIENTS HOSPITALIZED WITH COVID-19

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ABSTRACT

Introduction: To evaluate the association of Procalcitonin (PCT) with severity in Coronavirus disease 2019 (COVID-19), hospitalized patients and to test the hypothesis that it is an independent predictor of mortality.
Materials & Methods: This study was conducted at Chemical Pathology, Department of Pathology and Laboratory Medicine and Department of Medicine, Aga Khan University (AKU), Karachi Pakistan. Electronic medical records of all in-patients including both genders, and all age groups with documented COVID-19 from March to August 2020were reviewed and recorded on a pre-structured performa. The subjects were divided into two categories severe and non-severe COVID-19; and survivors and non-survivors. Between-group differences were tested using the Chi-square and Mann–Whitney's U-test. The receiver operating characteristic curve was plotted for serum PCT with severity and mortality. A binary logistic regression was used to identify variables independently associated with mortality. The data was analyzed using SPSS.

Results: A total of 336 in patients were reviewed as declared COVID-19 positive during the study duration, and 136 were included in the final analysis including 101 males and 35 females. Statistically significant difference in PCT was found between severe and non-severe COVID-19 (p value=0.01); and survivors and non-survivors (p value<0.0001).PCT, older age and increased duration of hospital stay were revealed as variables independently associated with mortality. On ROC analysis, an AUC of 0.76 for mortality prediction was generated for PCT.
Conclusions: Baseline serum PCT concentration is a promising predictor of mortality and severity in COVID-19 cases when considered in combination with clinical details and other laboratory tests.
Key Words: Procalcitonin, COVID-19, severe, mortality, prognosis

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SERUM PIVKA-II: REFERENCE INTERVAL OF HEALTHY POPULATION AND ESTABLISHMENT OF ITS CUTOFF VALUE FOR HEPATOCELLULAR CARCINOMA DIAGNOSIS IN PAKISTAN

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ABSTRACT

Background: Protein induced by vitamin K absence or antagonist-II (PIVKA-II) has been widely used as a bio-marker for hepatocellular cancer diagnosis for decades. However, the reference intervals for serum PIVKA-II have not been established in the Pakistani population. Thus, this study aimed to measure serum PIVKA-II levels in healthy Pakistani subjects and determine the cut-off value for hepatocellular carcinoma cases.
Material and Methods: It is a cross-sectional study. A total of 239 participants (120 Healthy and 119 diagnosed HCC cases) were recruited. Serum PIVKA-II level was measured on Chemistry Analyzer Alinity Abbott Alinity PIVKA-II reagent kit (1R1732). This assay is a chemiluminescent micro-particle immunoassay. The reference interval was estimated by percentile method.
Results: The distribution of PIVKA-II values showed no significant difference with sex and age. The 95% reference interval of PIVKA-II was 15.55-43.03mAU/ml in healthy Pakistani subjects and the cut-off was 148.81 mAU/ ml in HCC (hepatocellular carcinoma) cases. PIVKA-II level was significantly higher in males than in females (P < 0.003).

Conclusions: The reference interval of serum PIVKA-II was established in healthy Pakistani adults. This will be valuable for future clinical and laboratory studies. Different ethnic backgrounds and analytical methods underline the need for redefining the reference interval of analytes such as PIVKA-II, in central laboratories in different countries.
Key Words: PIVKA-II, Hepatocellular carcinoma, Reference interval, Alpha Feto Protein.

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DEVELOPMENT AND VALIDATION OF A LIQUID CHROMATOGRAPHY – TANDEM MASS SPECTROMETRY METHOD FOR ANALYSIS OF METHYLMALONIC ACID IN SERUM

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ABSTRACT

Objective: To develop and validate an accurate, cost effective method on liquid chromatography-tandem mass spectrometry for analysis of methylmalonic acid in serum.

Study design: Cross sectional (validation) study.

Place & duration of study: Department of Forensic Medical Sciences Laboratory, Forensic Toxicology Section, Armed Forces Institute of Pathology, Rawalpindi Pakistan.

Materials and Methods: Method development was initiated for detection of Methylmalonic acid using commercially available standards diluted in methanol to achieve analyte signal. For sample preparation, 300µl of extracting solution (Methanol: Acetonitrile: Formic acid in 2:2:1) along with 100 µl of d3-methylmalonic acid as internal standard were added to 100 µl of serum in a sample preparation vial. The mixture was mixed for 30 seconds on vortex mixer & subsequently centrifuged for 5 minutes at 11500 RPM. Centrifuged supernatant was filtered into a sample vial through 0.2 µm filter and injected in LC-MS/MS for analysis. Separation of compound was achieved with Agilent SB-C18 column (4.6 x150mm, 1.8 µm). For detection and quantification, a 6460 Triple quadrupole LC-MS system having an ESI source with jet steam technology along with software Mass hunter was used. Method validation studies were carried out on all these parameters with respect to linearity (calibration) with recovery, Limit of detection (LOD), Lower limit of quantitation (LLOQ), Analytical measurement range (AMR) by calibration curve analysis, sensitivity, precision, accuracy, stability after short/long term storage and freeze thaw cycle and Dilution effects.

Results: The AMR was 33-4227 nmol/l with LOD of 15 nmol/l. The lower limit of quantification was validated at 33 nmol/l. The calculated bias was -12.727. The within and between day imprecision at four levels of concentrations were 1-7.5%. The method was found stable after storage & freeze thaw cycle. The integrity of diluted sample was maintained for each dilution factor.

Conclusion: The presented method for MMA determination is accurate, cost effective, specific and having a good clinical correlation. This method can be used in routine for accurate estimation of methylmalonic acid levels with good time management and less financial burden.

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RELATIONSHIP BETWEEN PCR AND SARS COV2 ANTIBODY AMONG HEALTHCARE WORKERS

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ABSTRACT

Objectives: To study the association between Polymerase Chain Reaction and antibody positivity by assessing the antibody response in PCR positive Versus PCR negative COVID-19 exposed symptomatic/asymptomatic healthcare workers.

Methods: A Total of 102 healthcare workers (HCW) were included in this cross-sectional study by non probility consecutive sampling after written informed consent including doctors, nurses, laboratory, and janitorial staff who were working in isolation ward where symptomatic COVID-19 patients and their samples. Specimen swabs from posterior oropharyngeal wall and nasopharynx were taken to perform Polymerase Chain reaction (PCR) testing of SARS-CoV-2 and at the same time blood samples were drawn to measure the corresponding antibody response, within 8 weeks of their first duty in isolation ward. C-Reactive Protein (CRP) in mg/L was measured by immunoturbidimetry in both groups at the time of PCR.

Results: Mean age of our study participants was 31± 8.9 years. Of total 102 HCW, 60(58.8%) were males and 42(41.2%) were males. Forty-two (36.23%) were PCR positive and 60(63.76%) were PCR negative, 57(50.72%) had reactive antibodies and 45(49.28%) had non-reactive antibodies. Of 35 PCR positive subjects, 11 remained asymptomatic. There were 76% subjects who had positive PCR & reactive antibodies, 63.6% subjects with negative PCR and Non-reactive antibodies. Interestingly, (22)36.4% subjects had negative PCR but reactive antibodies. Likewise, 16.7% subjects had positive PCR but

non-reactive antibodies. However, statistically moderate significant association ($x^2(1) = 10.02$; *P=0.00*) was found between PCR positivity and antibody positivity**.** CRP in PCR positive HCWs was 1.5mg/L and PCR negative HCWs was 1mg/L.
Conclusions: Our results suggest that antibody development may be used as a screening tool for COVID-19 infection particularly in asymptomatic subjects.
Key Words: *Antibody, COVID 19, Health care workers, PCR*

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SCIENTIFIC SESSION -II

ABSTRACT PLENARY SESSION – II

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ASSOCIATION OF HYALURONIC ACID AND LAMININ WITH POLYMERASE CHAIN REACTION FINDINGS IN HEPATITIS C PATIENTS

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ABSTRACT

Objectives: 1. To find association of serum Hyaluronic Acid and Laminin levels with polymerase chain reaction findings in hepatitis C patients.

2. To find correlation between viral load, serum hyaluronic acid and serum laminin levels.

Study Design: Cross sectional descriptive study

Place and Duration of Study: Department of Chemical Pathology and Endocrinology at the Armed Forces Institute of Pathology (AFIP) in Rawalpindi, Pakistan. Duration of study was from December 2019 to July 2020.

Methodology: A total 180 diagnosed cases of Hepatitis C patients were included in this study. Frequencies and percentages were obtained for qualitative variables and Median (IQR: 25th percentile-75th percentile) for quantitative variables. To find association between PCR findings with Laminin and Hyaluronic acid cross tabulation was done after dividing laminin and hyaluronic acid into two groups according to their median by applying chi square test. Correlation of viral load, duration of disease, serum Hyaluronic acid and laminin were calculated using spearman's correlation.

Results: Out of 180 patients, 124(68.9) were males and 56(31.1) were females. Median age was 36 years while median duration of disease was 12 months. There was strong association between PCR positive cases with hyaluronic acid (p value <0.001) and serum laminin levels (p value <0.001). Correlation analysis revealed strong relationship between viral load and serum hyaluronic acid (r=0.889, p value <0.001) as well as with serum laminin (r=0.889, p value <0.001).

Conclusion: Current study established a strong significant association between PCR findings and disease duration with levels of serum laminin and hyaluronic acid. The levels of serum laminin and serum hyaluronic acid also correlate well with viral load and duration of disease.

Key Words: Hepatitis C, Hepatic fibrosis, Hyaluronic acid, Laminin

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CLINICAL AND ANALYTICAL VALIDATION OF INTERLEUKIN 6 (IL-6) IN THE CLINICAL LABORATORY IN COVID-19 PANDEMIC

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ABSTRACT

Background: Interleukin-6 (IL-6), a proinflammatory cytokine, has been reported to be associated with disease severity and mortality in patients with coronavirus disease 2019 (COVID-19). At the beginning of the pandemic, there were no FDA-approved IL-6 assays on the market. There were commercially available IL-6 assays that were granted emergency use authorizations by the FDA and validation of these assays did not require the same work effort as implementation of a Lab Developed Tests.

Objective: To verify manufacturers claims and clinically validate the IL-6 levels assay in a rush to bring this new COVID-19 biomarker to patients.

Methods: Analytical & clinical validation study of Interleukin 6 (IL6) was conducted at section of Chemical Pathology, Department of Pathology & Laboratory Medicine, Aga Khan University in June 2020. The kit was verified by conducting precision, accuracy, analytical measuring range, linearity, and two instrument comparison and diagnostic accuracy studies. For diagnostic accuracy specimens of COVID-19 PCR positive inpatients (n=26) and COVID-19 PCR negative lab volunteers (n=12) were used. Serum samples for IL6 with other prognostic biomarkers LDH, ferritin, CRP were collected in COVID-19 PCR positive inpatients and serum IL-6 in COVID-19 PCR negative volunteers. IL-6 was analyzed on Electrochemiluminescence Immunoassay "ECLIA" on COBAS e 411 immunoassay analyzer. Serum CRP was analyzed on immulite 2000 by chemiluminescent immunoassay and serum LDH and ferritin were analyzed on ADVIA CENTAUR XP analyzer and ADVIA 1800 respectively. Sensitivity and specificity of IL-6 with PPV/NPV was derived with COVID-19 PCR status. Comparison of median IL-6 between cases and controls was done using Mann Whitney U test. Concordance between serum IL6 with other prognostic biomarkers in COVID positive patients was also computed.

Results: Serum IL-6 was found high (>7 pg/ml) in 24/ 26 cases (COVID-19 PCR positive patients) as compared to 4/12 controls (PCR negative lab volunteers). On inquiry these 4 controls gave history of one of these autoimmune disease, thalassemia minor, recent road traffic injury and psoriasis. Sensitivity & specificity of IL-6 was 92.31% (95% CI= 74.87-99.05%) and 66.67 % (95% CI= 34.89-90.08%) respectively. PPV & NPV was 85.71% (95% CI=72.79-93.08%) and 80% (95% CI= 49.90-94.14%). Median (IQR) IL6 levels in cases (n=26) was 56.6 pg/ml (144.2-56.6) and <1.5 pg/ml (2.9-1.5) in

controls (n=8); p value <0.05. The CV calculated for the assay using EP evaluator was 2.5%. Linearity of IL-6 assay was checked over a measured range of 1.5-5000 pg/ml. AMR was calculated by running three controls of IL-6 in triplicate. >92% agreement of IL-6 was noted with other prognostic biomarkers.

Conclusion: Analytical validation and clinical validation were acceptable and IL-6 testing was initiated for COVID19 patients as a potential predictor for lung injury in COVID-19 patients.

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ASSESSMENT OF NATIONAL EXTERNAL QUALITY ASSURANCE PROGRAM OF PAKISTAN (NEQAPP) AS A TOOL FOR IMPROVING QUALITY OF LAB RESULTS AMONG PARTICIPATING LABORATORIES

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ABSTRACT

Objective: *To assess the Impact of the National External Quality Assessment Program of Pakistan (NEQAPP) in improving the quality of lab results among participating laboratories at the national level.*

Methods: *A survey questionnaire was developed and sent to the participating laboratories via email. Frequencies of their responses were calculated and analyzed using SPSS version*

Results: *A* digital questionnaire was sent to 150 laboratories, out of which 145 responded with a response rate of 96.6%. As per survey, 140 labs (95%) were satisfied by the information provided on the NEQAPP portal, 84.8% (123 labs) were pleased with the responsiveness of the program manager. 94.5% of laboratories are satisfied with the assessment criteria of NEQAPP. 93.8% reported they get timely, adequate, and intact proficiency samples, 90% of laboratories accepted they received samples in appropriate packing, while 89.3% reported that the cost of NEQAPP was reasonable. 93.8% accepted that NEQAAPP helped in improving technician's skills, while 94.5% acknowledged participation helped in identifying problems. 86.2% reported a reduction in the number of complaints related to laboratory results, While 93.1%reported laboratory credibility was increased after participation in NEQAPP 1.2. 90.3% indicated that clinician's confidence was improved, while 96.6% reported quality of their lab report improved

Conclusion: NEQAPP has significantly contributed in improving the Quality of Laboratory results among participating laboratories in Pakistan, by improving quality of lab services and by introducing standardized process.
Key Words: Quality control External Quality assurance, National Quality Assurance Program of Pakistan.

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COMPARISON OF IL-6 WITH OTHER INFLAMMATORY MARKERS AND THEIR ASSOCIATION WITH DIFFERENT LEVELS OF SEVERITY OF COVID-19 DISEASE SPECTRUM OF BIOCHEMICAL

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ABSTRACT

Objective: To assess correlation of various inflammatory markers with disease progression in COVID-19.

Study Design: Cross sectional study.

Place and Duration of Study: The study was conducted at Pak Emirates Military Hospital (PEMH), Rawalpindi, from Oct 2020 to Jan 2021.

Methodology: All confirmed COVID-19 patients admitted during this period were included in the study. Patients were categorized as mild, moderate and severe according to the symptoms as well as their location in different ward. Samples were collected from patients in medical wards, high dependency unit (HDU) and intensive care units (ICU). Sample was collected in plain tube for analysis of serum ferritin, quantitative C-reactive protein (CRP), Pro-BNP and Procalcitonin. For analysis of plasma IL-6, samples were collected in Lithium Heparin tube. Comparison of inflammatory markers amongst various groups was done to assess the association and correlation of these markers with the progression of disease.

Results: A total of 275 patients were studied, having mean age of 56.84 ±15.18. Out of these 199 (72.3 %) were males and 76 (27.6%) were females. Age of patients in mild group was 40.6 ± 12.6, in moderate 52.6 ± 14.7 and in severe cases it was 54.3 ± 15.4. C-reactive protein (CRP) , ferritin-BNP , Procalcitonin and IL-6 levels were significantly deranged in all groups with p-value of < 0.001.Data was analyzed using SPSS .Analysis of parameters showed that levels of all biochemical markers were significantly associated with all stages of the disease.

Conclusion: Majority of the patients with COVID-19 disease exhibited elevated levels of IL-6 and other inflammatory biomarkers. Their values were significantly increased as the disease progressed with the time. As increase in inflammatory markers correlate with disease severity, regular monitoring of **IL-6** with other parameters can improve the disease outcome.

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COMPARISON OF ESTIMATED GLOMERULAR FILTRATION RATE WITH BOTH SERUM CREATININE AND CYSTATIN C ($EGFR_{CR-CYS}$) VERSUS SINGLE ANALYTE ($EGFR_{CR}$ OR $EGFR_{CYS}$) USING CKD-EPI AND MDRD EQUATIONS IN TERTIARY CARE HOSPITAL SETTINGS

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ABSTRACT

Objectives:

1. Assessment and Comparison of glomerular filtration rate (eGFR) estimated through MDRD and CKD-EPI_{cr} equation in early and late stages of chronic kidney disease.
2. To compare eGFR based on biochemical marker creatinine ($eGFR_{cr}$), cystatin C ($eGFR_{cys}$) and both ($eGFR_{cr-cys}$) using CKD-EPI Equation in different stages of chronic kidney disease.

Study design: Observational, comparative cross-sectional study.

Place & duration of study: Study was conducted in Chemical Pathology and Endocrinology department of Armed Forces Institute of Pathology (AFIP) Rawalpindi in collaboration with Armed Forces Institute of Urology (AFIU) Rawalpindi from October 2019 to March 2020.

Methodology: GFR was assessed on the basis of Creatinine clearance taking serum and 24-hours urinary specimens. MDRD and CKD-EPI equation were applied to calculate eGFR by serum creatinine ($eGFR_{cr}$), cystatin C ($eGFR_{cys}$), and combined ($eGFR_{cr-cys}$). Pearson correlation technique was used to compare eGFR calculated by different equations with creatinine clearance in different stages of CKD. Performance of equations was evaluated and compared in different stage of CKD.

Results: A total of 181 subjects were enrolled; 104 (57.5%) male and 77 (42.5%) female. Median age was 57 (IQR, 25) years. Median (IQR) GFR (ml/min/1.73m^2) calculated by CrCl, MDRD, CKD-EPI$_{cr}$, CKD-EPI$_{cys}$ and CKD-EPI$_{cr\text{-}cys}$ equations were 45.1 (41.5), 50.6 (23.8), 52.0 (28.0), 43.0 (65.0) and 45 (47) respectively. eGFR calculated by CKD-EPI$_{cr}$ had positive and slightly higher correlation (r=0.880) than MDRD Study equation (r=0.867). While comparing the markers, it was observed that CKD-EPI$_{cys}$ had better correlation in early stages of CKD (r=0.889) whereas CKD-EPI$_{cr}$ performed better in late stages (r=0.896). CKD-EPI$_{cr\text{-}cys}$ had the highest correlation (r=0.984) at all stages of CKD.
Conclusion: eGFR calculated by CKD-EPI equation considered as better diagnostic efficient response than MDRD equation in diagnosis and staging of chronic kidney disease. While applying CKD-EPI equation for measurement of eGFR, eGFR$_{cr\text{-}cys}$ performs better than any of eGFR$_{cr}$ or eGFR$_{cys}$ at all stages of CKD.
Key Words: Estimated Glomerular Filtration Rate (eGFR); Cystatin C (cys); Creatinine (cr); Creatinine Clearance (CrCl); CKD-EPI equation; MDRD equation.

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ASSOCIATION OF LIVER AND RENAL FUNCTION DERANGEMENTS WITH DISEASE SEVERITY IN COVID-19 PATIENTS

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ABSTRACT

Objective: To determine association of Liver and Renal function derangements with disease severity in COVID-19 patients.
Study design: Cross sectional study
Place and duration of study: Study was conducted in Department of Pathology, Army Medical College, and Pak Emirates Military Hospital, Rawalpindi from April 2020 to May 2020.
Methodology: Data collection was done for 105 patients having RT-PCR positive for COVID-19 patients admitted in hospital over a period of 05 weeks. Patients with past history of liver disease, diabetes, hypertension and history of any renal abnormality were excluded from study. Patients were categorized as mild, moderate and severe according to the symptoms as well as their location in different wards. Patients in regular wards were considered as Mild, while those in High

Dependency Unit (HDU) were considered to have Moderate disease. Whereas patient admitted to Intensive Care Unit (ICU/ ITC) were considered as cases with severe disease.

Results: Out of 105 patients, 99 (94.2%) males and 06 (5.8%) females. Among LFTs, Bilirubin levels ($p<0.001$) were deranged significantly in all groups of COVID-19. Alanine Aminotransferase (ALT) ($p<0.001$), Alkaline phosphatase (ALP) ($p<0.006$) and Albumin ($p<0.001$) were also raised with disease severity in COVID-19 patients, but not significantly associated in mild to moderate disease status. Among RFTs, serum creatinine ($p= 0.027$), urea ($p\leq0.001$), potassium ($p\leq0.001$), were found significantly associated with disease severity. While serum Sodium levels ($p=0.091$) showed a non-significant association with infection. All these parameters had a positive correlation with COVID-19 except serum Potassium levels.

Conclusion: All patients of COVID-19 infection had some degree of deranged liver and renal function test irrespective of disease severity status. Hence, monitoring of these parameters is required in all covid-19 patients for better outcome.

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ASSOCIATION OF THERAPEUTIC DOSE OF VALPROIC ACID AND PLASMA GLYCINE LEVELS IN EPILEPTIC PATIENTS

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ABSTRACT

Introduction: Epilepsy is a chronic condition that affects more than 70 million people worldwide. It is characterized by recurrent unprovoked episodes of seizures/fits. Valproic acid is one of the first line drugs used in treatment of epilepsy and is known to increase plasma glycine metabolism, resulting in hyperglycinemia. Raised plasma glycine levels can precipitate seizures, so there is a requirement to monitor plasma glycine levels in epileptic patients on VPA.

Objectives:

- To determine the frequency of hyperglycinemia in epileptic patients taking valproic acid (VPA).
- To determine the correlation between therapeutic dose of valproic acid and plasma glycine levels in epileptic patients.

Study Design: Observational cross-sectional study.
Place and duration of study: Department of chemical pathology and endocrinology, Armed forces Institute of Pathology Rawalpindi, in collaboration with Combined Military Hospital Rawalpindi from July 2020 to December 2020.
Methodology: Plasma glycine levels were analyzed on HPLC Biochrome 30+ (High performance liquid chromatography) of epileptic patients undergoing treatment with anti-epileptic drugs (AEDs). Therapeutic doses of Valproic acid were taken as serum trough levels of VPA and analysed on chemiluminescence based Abbott Architect Plus i1000 SR. Mann Whitney U test was applied to compare Plasma glycine levels in epileptic patients on valproic acid and those on multiple AEDs. Spearman's correlation was used to correlate plasma glycine levels in epileptic patients with trough levels of valproic acid, duration of treatment and frequency of fits/year.
Results: A total of 77 participants were enrolled in our study, results showed that plasma glycine levels were significantly raised (p value < 0.05) in those epileptics who were on valproic acid (monodrug therapy), in comparison with those on multiple anti-epileptic drugs. There were significant positive correlations between glycine levels and trough valproic acid levels (r = 0.830), duration of treatment (r = 0.525) and frequency of seizures (r = 0.326).
Conclusion: Epileptic patients treated with valproic acid (VPA) had raised plasma glycine levels, that increased with therapeutic dose of VPA and duration of treatment, which was associated with increased frequency of fits in these patients.
Recommendations: Plasma glycine levels should be monitored in epileptic patients on long term VPA treatment.
Key Words: Epilepsy, Seizure, Glycine, Valproic acid.

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ALARMING INCREASE OF HYPERVITAMINOSIS D IN CHILDREN: A CROSS-SECTIONAL SURVEY OF CLINICAL PROFILES AND PHARMACOLOGICAL FACTORS FROM A TERTIARY CARE CENTER IN PAKISTAN

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ABSTRACT

Background: The increased awareness about vitamin D deficiency provoked significant increase in supplementation. Excessive, prolonged or disproportionate intake may lead to hypervitaminosis D. This study aims to determine the frequency, clinical features, and pharmacological factors of hypervitaminosis D in children.

Methods: A retrospective cross-sectional study was conducted. All children <18 years with 25-hydroxyvitamin D (25OHD) levels performed between January 1 to December 31, 2018 at AKUH Clinical Laboratory were evaluated. Medical records of children at AKUH with vitamin D level >50ng/ml were reviewed for clinical features and pharmacological risk factors.
Result: A total of 118,149 subjects were tested for serum 25OHD level in 2018, out of which 16,316 (13.8%) were children. Of these, 16.6% (n=2720) were registered at AKUH for consultation. Twenty-two percent (n=602) had serum 25OHD levels >50 ng/ml. The median age and 25OHD levels were 3.1 (17.93) years and 70.1(100) ng/ml with 57.3% (n=345) boys.
Use of vitamin D supplementation was reported in 33.1% (n=197) and of these 97.9% (n=193) were prescribed by physicians. Mega-doses were utilized by 34.17% (n=68) while rest had taken different combination in tablets/syrups form. In mega-doses, 600,000 (44.1%, n=30) and 200,000 units (45.5%, n=31) vitamin D injections were commonly prescribed. The main indications for prescribing were aches/pains (25.8%, n=51), developmental delay (25.3%, n=50), and vitamin D deficiency (24.8%, n=49). The main symptoms of hypervitaminosis D or toxicity were abdominal pain (13.7%), and constipation (15.7%).
Conclusion: Vitamin D supplementation should be used with caution in children as toxicity though rare but may happen and cause serious effects specially with frequent mega doses and prolonged supplementation.
Key Words: Hypervitaminosis D, Vitamin D toxicity, Children, Pakistan

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SPECTRUM OF BIOCHEMICAL DERANGEMENTS IN PATIENTS WITH COVID-19 INFECTION

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ABSTRACT

Background: A pandemic of Covid-19 caused by coronavirus-2 with severe acute respiratory syndrome erupted in December 2019. Till now, the pattern of disease is not fully understood and its treatment is not available.
Objective: This research aimed to evaluate the biochemical derangements in Covid-19 patients and their correlation with the severity of disease.
Patients and Methods: For this research, a total of 996 participants aged between 20 to 75 years from Military Hospital, Rawalpindi, Pakistan were retrospectively included in the analysis from 15th March to 14th June. Study participants were divided into mild, moderate, and severe disease groups. The mortality data of the patients was also followed up.

Results: In our data, there were 74.2% males and 25.8% females. Most of the patients were recovered and discharged from the hospital. The results showed that the patients with mild and moderate disease had abnormalities in liver function tests, serum phosphate level, and C-reactive protein. Patients with severe disease had marked derangements in levels of bilirubin, aspartate aminotransferase, albumin, creatinine kinase, phosphate, and C-reactive protein. From the ANOVA test, it was found that there had been significant difference among the disease group.
Conclusion: The patients suffering from Covid-19 has showed striking abnormalities in their biochemical markers including bilirubin, Aspartate aminotransferase, albumin, creatinine kinase, phosphate, and C-reactive protein. Derangement of biochemical parameters is increased proportionately with severity of disease. Hence these markers can be used in monitoring of the disease.
Key Words: Biochemical markers, Covid-19, Pakistan, Severity of symptoms.

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PARADIGM SHIFTS IN VITAMIN D TESTING AND DIAGNOSIS: A DECADE-LONG OBSERVATIONAL STUDY

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ABSTRACT

Background: There has been increasing awareness of Vitamin D deficiency. Lack of clear guidelines for optimum doses of Vitamin D and inadvertent use of higher doses can result in toxicity. This study was done to evaluate the trends of vitamin D testing and status of serum samples submitted for 25-hydroxy vitamin D (25-OHD) analysis to a large-volume reference laboratory.
Methods: An observational study was conducted at the section of Chemical Pathology, Department of Pathology and Laboratory Medicine, Aga Khan University. Data analysis of serum 25-OHD tests from January 2010 to December 2019 was performed. The patients were categorized as deficient, insufficient, optimal, hypervitaminosis and toxic based on 25-OHD values. Data was analyzed using Microsoft Excel version 16.

Results: Total 903,282 tests were analyzed during 10 years period, mean age (SD) being 40.7 (16.5) years, with 35.8% males. The 25-OHD testing since 2010 to 2109 increased by 62.3% in adults and 66.6% in children. The mean 25-OHD levels improved from 18.8 ng/ml in 2010 to 24.5 ng/ml in 2019 in adults, while no change in mean 25-OHD levels was noted in children.

Conclusion: Status of vitamin D improved with increased mean vitamin D levels and decline in deficiency over 10 years. Our study calls for developing local guidelines for vitamin D-deficiency management, and taking caution when prescribing supplements, as vitamin D intoxication is increasing in our population.

Key Words: 25 OH D, Hypervitaminosis D, Vitamin D toxicity, Deficiency, Insufficiency.

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DIAGNOSTIC ACCURACY OF RAISED NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN NGAL IN PREDICTING ACUTE KIDNEY INJURY AFTER CARDIAC SURGERY

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ABSTRACT

Introduction: Acute kidney injury after cardiac surgery occurs due to Rapid deterioration of renal function following cardiac surgery expressed a significant decrease in GFR currently measured by serum creatinine and urine output. The reported prevalence of cardiac surgery associated acute kidney injury is up to 30% and independently associated with increased morbidity and mortality. Acute kidney injury is managed with supportive measures however strategies exist that may prevent renal insult by early detection and hence better outcomes. Currently serum creatinine is widely used to monitor kidney function, its level rises significantly when renal function is compromised particularly when GFRFalls <60 ml per minute. Experimental and clinical studies have identified new biomarker NEUTROPHIL GELATINASE ASSOCIATED LIPOCALIN NGAL as an early predictive biomarker for acute kidney injury. it is protease resistant 25 KDA polypeptide of lipocalin Super family.

Objective: To determine Diagnostic accuracy of raised neutrophil gelatinase-associated lipocalin in predicting acute kidney injury after surgery taking serum creatinine as a gold standard.

Study design: Cross sectional study.

Study duration: Six months
Setting: Department of Pathology in collaboration with cardiac surgery unit Quaid E Azam Medical college Bahawal Victoria Hospital Bahawalpur.
Sampling: Non probability consecutive.
Material and method: Calculated sample size is 123 with 95% confidence interval 10% margin of error. After informed consent taken from patients, between age 40 to 70 years, all gender and any elective cardiac surgery in cardiac surgery department, were taken. Urine sample taken after two hours of surgery and presence and absence of AKI noted with levels greater than 27ng/ml. Serum creatinine of these patients was measured after 48 hours of operation. Levels of both are compared.
Conclusion: Presence of acute kidney injury after cardiac surgery is 36.26% and raised neutrophil gelatinase-associated lipocalin is 87.9% sensitive and 71.7 % specific for acute kidney injury. NEUTROPHIL GELATINASE ASSOCIATED LIPOCALIN levels were raised earlier as compared to serum creatinine.

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ACCURACY OF GLYCATED HEMOGLOBIN (HBA1C) ANALYSIS VIA POCT VS LABORATORY-BASED ASSAY IN DEPARTMENT OF PATHOLOGY, BAHAWAL VICTORIA HOSPITAL, BAHAWALPUR

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ABSTRACT

Background: The glycated hemoglobin has become an important entity in assessment of chronic glycemia with its established role in diagnosing diabetes mellitus and prevention of diabetic complications by helping in achieving better glycemic control. HbA1c assays available on Point of care testing (POCT) devices are providing convenience for physicians and patients in terms of reduced number of visits and improved patient management at the spot. A lot of work, however needs to be done in determining the accuracy of these assays as compared to standard laboratory-based assays for better outcome.
Objective: The objective of this study was to determine the accuracy of HbA1c via POCT in comparison with laboratory-based analysis.

Materials and Methods:
Study design: Cross-sectional study
Setting: Department of Pathology, Bahawal Victoria Hospital, Bahawalpur.
Duration: 6 months, Aug 2020-Dec 2021.
This study was conducted on known diabetics aged 40-70 years, both genders, presenting at diabetes clinic of outpatient department of Bahawal Victoria Hospital, Bahawalpur. With informed consents, blood samples were collected and HbA1c assessed at POCT using Clover A1c (HbA1c analyzer) fully automated boronate affinity assay. Same samples were run in pathology laboratory, Bahawal Victoria Hospital, using Clinical Chemistry Analyzer AU680|Beckman Coulter. Data was entered and analyzed using SPSS-23 version. Hemolyzed samples were excluded.
Results: Based on the data collected from analysis of 85 samples, HbA1c results on POCT were found equivalent to laboratory-based assay. P value was <.001, hence study was found to be significant.
Conclusion: POCT provides results equivalent to central laboratory assay, however, measures need to be taken for improving its accuracy.

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