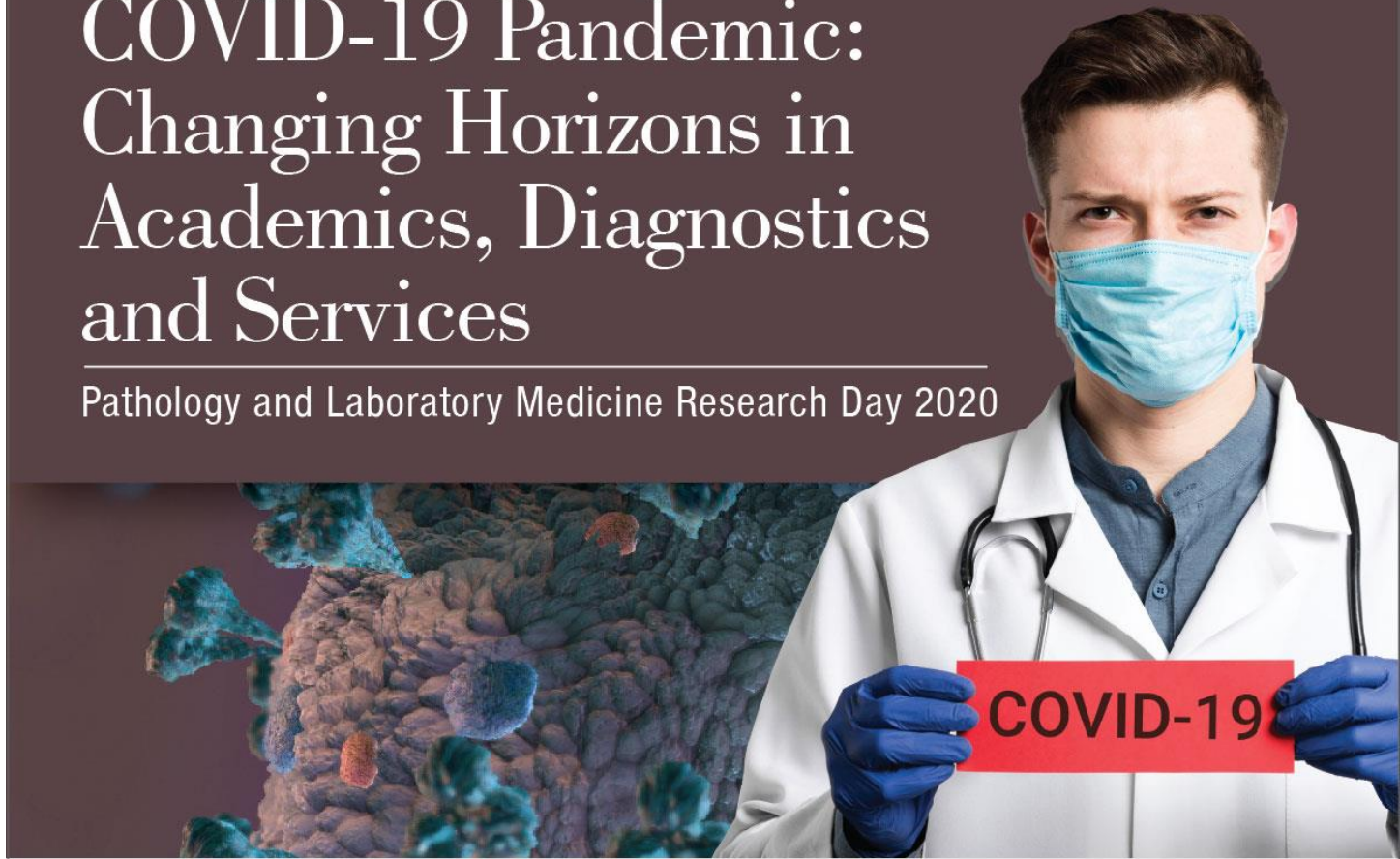# Impact and Response to the COVID-19 Pandemic: Changing Horizons in Academics, Diagnostics and Services

Pathology and Laboratory Medicine Research Day 2020

**COVID-19**

# Abstract book

## Monday, December 21, 2020

**Contact**
pathology.labmed@aku.edu | 021 3486 4547/4513

Please note: The CME E-Certificate fee of Rs.300/- would be charged
(for AKU and outsider both participants).
Attendance and post event evaluation form is mandatory to get E-Certificate.

آغا خان يونيورسٹى
THE AGA KHAN UNIVERSITY

# Message

We welcome all the attendees to the Department of Pathology and Laboratory Medicine Research Day 2020. This event gives an opportunity to celebrate research related activities of the department. Our aim is to provide outstanding diagnostic services, achieve excellence in teaching & research, and to promote growth of faculty members, staff, undergraduate and postgraduate students.

Throughout 2020, unquestionably, the only universal burning issue of the year, has been the threat of the COVID-19 pandemic.  We all know that the outbreak of COVID-19 pandemic has created a global health crisis that has had a deep impact on the way we perceive our world and our everyday lives. The multifaceted problems posed by COVID-19 are not only limited to diagnosis, safety measures and treatment, but also how to handle and manage the crisis in order to prevent collapse of any system.  The Pathology Research Day is a great platform to address some of the problems and solutions connected with COVID 19 through research work. Therefore, we selected "Impact and Response to the Covid-19 pandemic: Changing horizons in Academics, Diagnostics and Services" as the theme for the Pathology research day 2020.

We hope that this activity will serve as a platform for the entire AKU academic community to connect, collaborate and share the ideas for further learning, research and leading. We invite everyone to join and encourage young enthusiastic researchers and offer them suggestions. It is important to acknowledge their contributions to the university and society.

In the end, we would like to thank all those who participated in the planning phase and worked tirelessly in the organization of this event.


**Dr. Nasir Ud Din**                                    **Dr. Afia Zafar**
Associate Professor & Chair,                      Professor & Chair,
Departmental Research Committee            Department of Pathology and Laboratory Medicine

# Members of Organizing Committee
## Research Day 2020

**Dr. Nasir Uddin**           **Chair**           **Histopathology**

**Resource Person**

Dr. Rumina Hasan           Microbiology

Dr. Bushra Moiz           Haematology Transfusion and Medicine

Dr. Erum Khan           Microbiology

**Members**

Dr. Joveria Farooqi           Microbiology

Dr. Anila Rashid           Haematology Transfusion and Medicine

Dr. Najia Ghanchi           Molecular Pathology

Dr. Kiran Iqbal           Molecular Pathology

Dr. Mohammad Usman Tariq           Histopathology

Dr. Sibtain Ahmed           Chemical Pathology

Dr. Hafsa Majid           Chemical Pathology

Dr. Mustafa Aslam           Forensic Medicine

Ms. Shamsha Punjwani           Pathology and Laboratory Office

Ms. Amna Nasir           Research Office

Ms. Zohra Hajiani           Pathology and Laboratory Office

Ms. Gulnar Zafar Ali           Pathology and Laboratory Office

Ms. Mahek Anwar Ali           Pathology and Laboratory Office

Ms. Sara Baber           Research Office

Ms. Shahnila Alidina           Research Office

# Research Day 2020
## Department of Pathology and Laboratory Medicine
### Monday, Dec 21, 2020| 1:30-4:30PM | Virtual, Aga Khan University, Karachi

## Theme: Impact and response to COVID19 pandemic; changing horizons in academics, diagnostics and services

## Programme at a Glance

| Time | Programme |
| --- | --- |
| 13:30 -13:35 | **Tilawat** |
| 13:35 -13:40 | **Dr Nasir Ud Din:** Welcome address<br>Chair, Organizing Committee of Research day |
| 13:40 –13:55 | **Plenary Lecture: Dr Adil Haider, Dean Medical College AKU:** Pathology and Laboratory Medicine: Challenge Accepted! |
| 13:55–14:10 | **Keynote Speaker: Dr Faisal Sultan, CEO SKMCH & Special Assistant to Prime Minister on National Health Services:** Public health measures taken by Government during the second wave of Covid-19 Pandemic and current status / Strategies taken by Government Health Department to reduce spread of Covid-19 pandemic |
| **Research and Education** | |
| 14:10–14:20 | **Dr Afia Zafar, Chair Department of Pathology & Laboratory Medicine:** Research: Impact, Response and future directions |
| 14:20–14:30 | **Dr Romana Idrees:** Challenges and experience of Online Undergraduate Medical Education in COVID era |
| **Turbo Talks** (Numbers 8, time allocated: 5 minutes each) | |
| 14:30-14:35 | **Asghar Nasir**: SARS-CoV-2 genome analysis of strains in Pakistan reveals GH, S and L clade strains at the start of the pandemic |
| 14:35-14:40 | **Najia Ghanchi:** Understanding transmission dynamics of SARS-CoV-2 in Pakistan |
| 14:40-14:45 | **Hana Mahmood:** Health Intervention for Pneumonia and COVID-19 Infection Prevention and Control (IPC) in Rural Pakistan |
| 14:45-14:50 | **Jahanzeb Shahid:** Correlation of Computerized Tomography (CT) Severity Score for COVID-19 pneumonia with Clinical Outcomes |
| 14:50-14:55 | **Salima Rattani:** Evaluation of semi-quantitative compared to quantitative cultures of tracheal aspirates for the yield of culturable respiratory pathogens – A cross-sectional study |
| 14:55-15:00 | **Humaira Shafaq:** Comparative Analysis of N95 Respirators Fit Testing with Commercially Available and in-House Reagent. |
| 15:00-15:05 | **Zahra Hassan:** Breaking sampling bottlenecks using 3D-printed nasal swabs for SARS-CoV-2 PCR testing |
| 15:05-15:10 | **Kiran Iqbal**: IgG to Spike and receptor binding domain (RBD) protein of SARS-CoV-2 as a tool to evaluate protective antibody responses |

| 15:10-15:25 | BREAK, Virtual Poster Gallery |
|---|---|
| | **Training, Teaching & Service** |
| 15:25–15:35 | **Dr Kausar Jabeen**: Pathology residency programs: contribution, adaptation and resilience during COVID-19 pandemic |
| 15:35–15:45 | **Dr Bushra Moiz, Service Line Chief, Department of Pathology & Laboratory Medicine:** Role of clinical laboratories in promoting research |
| | **Turbo Talks** (Numbers 7, time allocated: 5 minutes each) |
| 15:45-15:50 | **Kanwal Shafiq:** ABO blood group discrepancies at a tertiary care hospital |
| 15:50-15:55 | **Hareem Alam:** Clinical significance of routine hematological and coagulation parameters in intensive care-patients having Covid-19 |
| 15:55-16:00 | **Muhammad Umer:** Procalcitonin as a Predictor of Severity and Mortality in a Cohort of Patients Hospitalized with COVID-19 |
| 16:00-16:05 | **Natasha Bahadur Ali:** Safety and Efficacy of Convalescent Plasma Treatment in COVID-19 Patients at a Tertiary Care Centre in Pakistan – COLLATE Trial |
| 16:05-16:10 | **Joveria Farooqi:** COVID-19-associated pulmonary aspergillosis (CAPA) in patients admitted with severe COVID-19 pneumonia: An observational study from Pakistan |
| 16:10-16:15 | **Rashna Hoshang:** Stress and Anxiety among General Dental Practitioners, Specialist Dental Practitioners and Dental Surgery Assistants in Treating Dental Patients during the Coronavirus Pandemic: A Cross Sectional Survey |
| 16:15-16:20 | **Tamana Asghari:** Programmed death ligand (PDL-1) expression in breast carcinoma |
| 16:20-16:30 | **Vote of Thanks** |

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# Research Day
# Abstracts

## 1.0 Diagnostics

### 1.1 COVID-19-associated pulmonary aspergillosis (CAPA) in patients admitted with severe COVID-19 pneumonia: An observational study from Pakistan

*Joveria Farooqi, Nosheen Nasir, Syed Faisal Mahmood, Kauser Jabeen*
*\*Section Microbiology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** Invasive aspergillosis is a well-known complication of severe influenza pneumonia with acute respiratory distress syndrome (ARDS). However, recent studies are reporting emergence of aspergillosis in severe COVID-19 pneumonia, named as COVID-19-associated pulmonary aspergillosis (CAPA).

**Methods:** A retrospective observational study was conducted in patients with severe COVID-19 pneumonia from February 2020 to April 2020. Patients ≥18 years of age with clinical features and abnormal chest imaging with confirmed COVID-19 by RT-PCR for SARS-CoV-2 were included. CAPA was diagnosed based on clinical parameters, radiological findings and mycological data. Data were recorded on a structured proforma, and descriptive analysis was performed using Stata ver 12.1.

**Results:** A total of 147 patients with confirmed COVID-19 and 23 (15.6%) patients requiring ICU admission were identified. Aspergillus species were isolated from tracheal aspirates of nine (39.1%) patients, and of these, five patients (21.7%) were diagnosed with CAPA and four (17.4%) had Aspergillus colonisation. The mean age of patients with CAPA was 69 years (Median age: 71, IQR: 24, Range: 51-85), and 3/5 patients were male. The most frequent co-morbid was diabetes mellitus (4/5). The overall fatality rate of COVID-19 patients with aspergillosis was 44% (4/9). The cause of death was ARDS in all three patients with CAPA, and the median length of stay was 16 days (IQR: 10; Range 6-35 days).

**Conclusion:** This study highlights the need for comparative studies to establish whether there is an association of aspergillosis and COVID-19 and the need for screening for fungal infections in severe COVID-19 patients with certain risk factors.

### 1.2 Clinical significance of routine hematological and coagulation parameters in intensive care-patients having Covid-19

*Hareem Alam, Bushra Moiz, Faisal Mehmood,*
*\*Section Haematology Transfusion and Medicine, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** In Pakistan, more than 2.65 million cases of COVID-19 have been confirmed as of July 20, 2020, resulting in over 5,599 deaths. Phylogenetic inferences substantially suggest that SARS-CoV-2, originating in China, has now evolved into various variants which are specific to regions. Various studies reported lymphopenia to be a cardinal prognostic marker in COVID-19 cases. Significance of neutrophil/lymphocyte ratio (NLR) and peak platelet/lymphocyte ratio has also been implicated in severe cases.

**Objective** This study was done to understand the prognostic significance of routine hematological, coagulation and biochemical parameters in patients admitted in intensive care unit in an academic medical Centre.

**Methods** The patients admitted in intensive care unit at Aga Khan University hospital with confirmed COVID-19 diseases during March to May 2019 were evaluated. Various routine laboratory parameters including complete blood count, prothrombin time, activated thromboplastin time, d-dimer, serum ferritin, serum lactate dehydrogenase, procalcitonin were observed on day of presentation, day -10 and at the last follow up. Repeated Annova (SPSS) was used to determine the significance of repeated measures. Multiple regression analysis was utilized to evaluate the prognostic significance of the laboratory parameters.

**Results** 77 patients were selected for the study. The absolute lymphocyte count (ALC) amongst survivor's vs non survivors on the final follow up was 1.630 vs 0.910 x $10^9$/l (p=0.001), which was statistically significant. Data from last follow up revealed that the median neutrophil/lymphocyte ratio (NLR) amongst those who survived was 4.48 whereas the median NLR in non survivors was 15.37 (p<0.001). In our study, the median value of D-dimer amongst those who survived and those who did not was 1.7 vs 5.4 mg/l (p=0.012).

**Conclusion** Absolute lymphocyte count, NLR ratio and D-dimer levels show significant differences between patients who survived vs those who had a fatal outcome.

### 1.3 Procalcitonin as a Predictor of Severity and Mortality in a Cohort of Patients Hospitalized with COVID-19

*Muhammad Umer Effendi, Sibtain Ahmed, Zeeshan Ansar Ahmed, Naveed Haroon Rashid,*
*Maheen Mansoor, Lena Jafri.*
*\* Section Chemical Pathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**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.

### 1.4 Correlation of Computerized Tomography (CT) Severity Score for COVID-19 pneumonia with Clinical Outcomes

*Ainan Arshad, Kiren Hilal, Jehanzaib Shahid, Abdullah Amin, Russell Martins, Avinash Nankani,*
*\*Department of Medicine, Aga Khan University, Karachi, Pakistan*

**Introduction:** Various CT severity scores have already been described in literature since the start of this pandemic. One pertinent issue with all of the previously described severity scores is their relative challenging calculation and variance in inter-observer agreement. The severity score proposed in our study is relatively simpler, easier to calculate and apart from a trained radiologist, can easily be calculated even by physicians with good inter-observer agreement. Therefore, a rapid CT severity score calculation can give a clue to physician about possible clinical outcome without being dependent on radiologist who may not be readily available especially in third world countries.

**Objective**: The objective of this study is to develop a simple CT severity score (CT-SS) with good inter-observer agreement and access its correlation with clinical outcome.

**Methods:** This retrospective study was conducted by the Department of Radiology and Internal Medicine, at the Aga Khan University Hospital Karachi, from April 2020 to August 2020. Non-probability consecutive sampling was used to include all patients who were positive for COVID-19 on PCR and underwent CT chest examination at AKUH. Severity of disease was calculated in each lobe based on following proposed CT severity scoring system (CT-SS). For each lobe the percentage of involvement by disease was scored – 0% involvement was scored 0, <50% involvement was scored 1 and >50% involvement was scored 2. Maximum score for one lobe was 2 and hence total maximum overall score for all lobes was 10. Continuous data was represented using mean and standard deviation and compared using independent sample t-tests. Categorical data was represented using frequencies and percentages and compared using Chi-squared tests. Inter-observer reliability between radiologist and physician for the 10-point CT-SS rated on 0-10 was assessed using the Kappa statistic. A $p$-value < 0.05 was considered significant for all analyses.

**Results:** A total of 73 patients were included, the majority male (58.9%) with mean age 55.8 ± 13.93 years. The CT-SS rated on 0-10 showed substantial inter-observer reliability between radiologist and physician with a Kappa statistic of 0.78. Patients with CT-SS 8-10 had a significantly higher ICU admission & intubation rate (53.8% vs. 23.5%) and mortality rate (35.9% vs. 11.8%; p = 0.017), as compared to those with CT-SS 0-7.

**Conclusion:** We conclude that the described CT severity score (CT-SS) is a quick, effective and easily reproducible tool for prediction of adverse clinical outcome in patients with COVID 19 pneumonia. The tool shows good inter-observer agreement when calculated by radiologist and physician independently.

### 1.5    Evaluation of semi-quantitative compared to quantitative cultures of tracheal aspirates for the yield of culturable respiratory pathogens – A cross-sectional study.

*Salima Rattani, Joveria Farooqi, Ghazala Jabeen, Saeeda Chandio, Qaiser Kash, Aijaz Khan, Kauser Jabeen.*
*Section Microbiology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Introduction:** Diagnosis of lower respiratory tract infections (LRTI) depends on the presence of clinical, radiological and microbiological findings. Endotracheal suction aspirates (ETSA) is the commonest respiratory sample sent for culture from intubated patients. Very few studies have compared quantitative and semi-quantitative processing of ETSA cultures for LRTI diagnosis. We determined the diagnostic accuracy of quantitative and semi-quantitative ETSA culture for LRTI diagnosis, agreement between the quantitative and semi quantitative culture techniques and the yield of respiratory pathogens with both methods.

**Methods:** This was a cross-sectional study conducted at the Aga Khan University clinical laboratory, Karachi, Pakistan. One hundred and seventy-eight ETSA samples sent for routine bacteriological cultures were processed quantitatively as part of regular specimen processing method and semi-quantitatively. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy was calculated for both methods using clinical diagnosis of pneumonia as reference standard. Agreement between the quantitative and semi quantitative methods was assessed via the kappa statistic test. Pathogen yield between the two methods was compared using Pearson's chi-square test.

**Results:** The quantitative and semi-quantitative methods yielded pathogens in 81 (45.5%) and 85 (47.8%) cases respectively. There was complete concordance of both techniques in 155 (87.1%) ETSA samples. No growth was observed in 45 (25.3%) ETSA specimens with quantitative culture and 37 (20.8%) cases by semi-quantitative culture. The diagnostic accuracy of both techniques were comparable; 64.6% for quantitative and 64.0% for semi-quantitative culture. The kappa agreement was found to be 0.84 (95% CI, 0.77-0.91) representing almost perfect agreement between the two methods. Although semi-quantitative cultures yielded more pathogens (47.8%) as compared to quantitative ETSA cultures (45.5%), the difference was only 2.3%. However, this difference achieved statistical (chi-square p-value <0.001) favoring semi-quantitative culture methods over quantitative culture techniques for processing ETSA.

**Conclusion:** In conclusion, there is a strong agreement between the performances of both methods of processing ETSA cultures in terms of accuracy of LRTI diagnosis. Semi-quantitative cultures of ETSA yielded more pathogens as compared to quantitative cultures. Although both techniques were comparable, we recommend processing of ETSA using semi-quantitative technique due to its ease and reduced processing time.

### 1.6    SARS-CoV-2 genome analysis of strains in Pakistan reveals GH, S and L clade strains at the start of the pandemic

*Asghar Nasir, Najia Karim Ghanchi, Kiran Iqbal, Waqasuddin Khan, Syed Hani Abidi, Syed Faisal Mahmood.*
*Section Molecular, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** A populous country with a high infectious disease burden and limited healthcare infrastructure, the increasing burden of SARS-CoV-2 infections in Pakistan have been watched with great trepidation. As of mid-July there are 262,000 COVID cases with 5,500 deaths with an estimated case fatality rate of (2%).

**Methods:** We conducted whole genome sequencing (WGS) of SARS-CoV-2 strains from Karachi, Pakistan isolated in March and May 2020. Phylogenetic analysis was conducted, and genome diversity was investigated.

Results: Isolates from travelers clustered with strains from China, Iran, Turkey, Saudia Arabia, India, USA and Australia. Five of eight SARS-CoV-2 strains from Karachi belonged to GH clade with Spike glycoprotein D614G, Ns3 gene Q57H and RNA dependent RNA

polymerase (RdRp) P4715L mutations. Two were S clade (ORF8 L84S and N S202N) and one was a L clade strain. Additional Pakistani isolates comprised two L and one I clade strain. A GH and L strain had Orf1ab L3606F mutation indicating further evolutionary transitions.

**Conclusions:** This first description of SARS-CoV-2 strains from Pakistan reveals strains of L, G, S and I clades isolates circulating from March at the start of the pandemic in the country. Continuing molecular epidemiology of SARS-CoV-2 strains in the context of COVID-19 severity is required to understand transmission patterns and related host factors of the disease in Pakistan.

## 1.7 IgG to Spike and receptor binding domain (RBD) protein of SARS-CoV-2 as a tool to evaluate protective antibody responses

*Kiran Iqbal, Syed Hani Abidi, Erum Khan, Natasha Ali, Hassan Hayat, Syed Faisal Mahmood.*
*\*Section Microbiology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Introduction** SARS-CoV-2 is the causative agent of the COVID-19. Urgent improvements in diagnosis, treatment and management of COVID-19 are required to curtail the impact of this disease. It is important to have tools to measure SARS-CoV2 -induced antibody as a measure of virus induced host protection. This would allow us to identify individuals who are potentially 'protected' against COVID-19 and those who have had prior exposure to the virus. Further, there is a role for convalescent sera in the treatment of COVID-19 and this requires the identification of potentially useful antibodies in donor sera prior to transfusion to patients.

**Methods:** SARS-CoV-2 recombinant protein was received from NOVA University Portugal. The IgG assay was developed in collaboration with University of Lisbon. We screened sera in four cohorts of study subjects; 50 health endemic controls collected from a pre-pandemic period (2018-2019). We tested 43 convalescent plasma from recovered COVID-19 positive cases. We tested 200 sera collected from COVID-19 confirmed cases during their in-patient stay; these included cases who had a positive SARS-CoV-2 respiratory PCR test and those who were negative for the same. Patients who were COVID-19 suspects but primarily had a neurological stroke were also included.

**Results:** ELISA for IgG to Spike protein was used as a screening assay. IgG to RBD of Spike was used as a confirmatory assay. Of the healthy controls tested, five cases had a positive IgG antibody response to SARS-CoV-2 RBD. Of the convalescent plasma tested, 40/43 had a positive IgG RBD response. Of the COVID-19 in patient cases tested, the majority of cases had a positive response to IgG to RBD. This included patients who were COVID-19 suspected but had a negative SARS-CoV-2 test. We found positive IgG responses in stroke patients who had a negative SARS-CoV-2 test. The level of IgG to RBD varied between individuals. As levels of IgG to RBD are found to be associated the development of neutralizing antibodies to SARS-CoV-2, this may correlate with levels of protection present in individuals.

**Conclusions:** We established a screening and confirmatory assay for measuring protective IgG response to SARS-CoV-2. This has utility in identifying appropriate convalescent plasma for COVID-19 treatment. Also, in the diagnosis of COVID-19 in patients who present with non-respiratory manifestations of the disease.

## 1.8 Programmed death ligand-1 expression in breast carcinoma

*Tamana Asghar, Naila Kayani, Mohammad Usman Tariq, Khurram Minhas, Summaya Zafar, Madeeha Nisar, Anam Ghauri.*
*\*Section Histopathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** Breast cancer (BC) is the most common malignant tumor found in women of all ages and it is the second malignancy resulting to death, after lung carcinoma. Over the years, a number of studies have been conducted on diagnostic, predictive and prognostic markers of BC. Programmed death ligand 1 (PDL-1) has emerged as a promising marker in non-small cell lung carcinoma with a potential therapeutic role in triple negative breast carcinoma (TNBC). PDL-1 is a 40 kDa transmembrane protein that is expressed on a wide variety of normal tissues and different tumor types. PDL-1 expression has been found to be associated with other factors of poor prognosis but with better survival.

The significance and the prognostic role of PDL-1 expression in breast carcinoma is not well established. The results of our study will help better understanding the disease behavior, predicting disease progression and planning further management.

**Objective:** To determine the frequency of Programmed Death Ligand 1 (PDL-1) immunohistochemical expression in breast carcinoma.

**Materials and Methods:** This prospective cross-sectional study was conducted at Section of Histopathology, Department of Pathology and Laboratory Medicine, Aga Khan University. After non-probability consecutive sampling, a total of 82 samples of BC which were diagnosed between January 2020 and June 2020 were included in this study. Tissue from the resection specimen was stained with PDL-1 immunohistochemical (IHC) stain.

**Results:** Patients' mean age was 46.35 years with ±SD = ±12.585 years. Mean tumor size was 4.339 cm with ±SD = ±2.2213 cm. Majority of the patients i.e. 79 (96.3%) showed histologic grade 3 invasive carcinoma. Ductal carcinoma in situ component was present in 18 (22%) of patients. Presence of lymphovascular invasion was seen in 21 (26%) and necrosis in 39 (48%) of cases. Eight (9.8%) cases were T1, 42 (51.2%) were T2, 27 (32.9%) were T3 and 5 (6.1%) were T4 stage. Thirthy eight (46.3%) cases were N0, 12 (46.6%) were N2, 10 (12.2%) were N2 and remaining 4 (4.9%) were N3. Out of all the 82 cases, 66 (80.5%) showed positive PDL-1 IHC expression. Higher frequency of PDL1 expression was observed in metaplastic carcinoma, histologic grade 3 and T2 & T3 tumors. However, significant association was observed with pathologic T stage (p value = 0.002). While rest of the parameters were not significantly associated with PDL-1 IHC expression.

**Conclusion:** The findings of our study highlighted that PDL-1 was expressed in large percentage of TNBC cases. PDL-1 expression was frequently seen in metaplastic BC, grade 3 tumors and tumors with stage 2 and 3 disease. PDL1 expression was significantly associated with pathologic T stage. Study of large cohorts are required to establish a possible prognostic role of PDL1 in BC.

**1.9 Comparison of Beta-D-Glucan levels between Candida auris and other Candida species at the time of candidemia**

*Hammad Niamatullah, Joveria Farooqi, Kausar Jabeen, Seema Irfan, Afia Zafar, Faisal Malik*
*Department of CITRIC, Aga Khan University, Karachi, Pakistan*

**Objectives:** To compare serum BDG levels in candidemia with different Candida species, especially C. auris.

**Methods:** Aga Khan University clinical laboratory database was retrospectively reviewed from June 2015 - December 2019. Blood culture positive cases with any Candida species and concomitant BDG level were included.

**Results:** Among the 213 cases included in our study, 54 were C.albicans, 59 C.auris, 8 C.glabrata, 37 C.parapsilosis, 47 C.tropicalis, and 8 other Candida species. The level of BDG was significantly lower in C.auris (mean = 156.6, 95% CI = 106.4 - 206.8 pg/ml) and C.parapsilosis (mean =181.9, 95% CI = 111.07 - 252.85 pg/ml) compared to C.albicans (mean = 276.4, 95% CI = 220.7 - 332.1 pg/ml) and C.tropicalis (mean = 292.6, 95% CI = 233.3 - 351.8 pg/ml). The sensitivity of serum BDG was lower for C.auris (48.2%) and C.parapsilosis (48.7%) than other Candida species (range: 72.9-87.5%). There was no effect of concomitant bacterial infections or antimicrobials on BDG level. There was a significant increase in BDG levels with concomitant fungal infections (mean =195.2, 95% CI =123.7 - 266.6 pg/ml).

**Conclusion:** Serum BDG has lower sensitivity in patients with suspected C.auris candidemia in our setting. Considering that C.auris has higher morbidity and mortality compared to other species, a more sensitive test is required.

**1.10 Solitary Fibrous Tumor of head and neck -A distinct entity**

*Tamana Asghari, Nasir Uddin, Mohammad Usman Tariq, Asad Dewan, Madeeha Nisar, Summaya Zafar, Anam Ghauri.*
*\*Section Histopathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Objective:** To describe the clinicopathological features of Solitary fibrous tumor (SFT) of head and neck.

**Methodology:** 24 cases of head and neck SFT were identified from the archives of histopathology at Aga Khan University Hospital between years 2010-2019. The cases were reviewed by two consultant histopathologists. The morphological features included spindle cells arranged predominantly in a characteristic "patternless pattern" within a collagenous stroma along with rounded vessels having hyalinized walls. Clinical data was obtained from histopathological reports and follow up was obtained via telephonic conversation.

**Results:** The age ranged from 18-85 years with a median age of 45 years. The tumor site showed a predilection for nasal cavity, rest included orbit, neck, cheek, lacrimal gland, eyelid, scalp, palate, maxilla and mastoid. A total of 17 cases could be retrieved from the archives for case review, out of which 11/17 showed moderate increase in cellularity, 15/17 showed necrosis,7/17 showed fascicular and storiform arrangement, amanthoid fibres were seen in 6/17 cases and hemangiopericytoma like vasculature was seen in 16/17 cases. Only one case showed atypical mitosis. Six cases showed features of malignancy such as mitosis, necrosis and pleomorphism while rest were all benign. Immunohistochemical stain CD34 was positive in 21 out of 24 cases. Follow up of 9 patients could be attained and one was found to have expired due to some undiagnosed pulmonary disease rest were all healthy. Treatment of all patients was excision alone except for one patient with features of malignancy who received radiotherapy.

**Conclusion:** SFT of head and neck are a distinct entity with majority of them behaving in a benign fashion commonly treated by local excision. IHC stain CD34 was consistently positive in all of the cases. Chances of recurrence and need for neoadjuvant therapy is restricted for those with positive margins. A NAB2-STAT6 gene mutation has been reported irrespective of anatomic site. Hence recently STAT6 has been considered as a reliable marker for diagnosis.

**1.11 Hyperferritinemia in COVID-19 Patients- An Evaluation of Serum Ferritin for Prediction of Morbidity and Mortality**
*Sibtain Ahmed, Zeeshan Ansar Ahmed, Imran Siddiqui, Naveed Haroon Rashid, Maheen Mansoor, Lena Jafri*
*\* Section chemical pathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Objectives:** To evaluate the association of ferritin with severity in Coronavirus disease 2019 (COVID-19), hospitalized patients and to test the hypothesis that it is an independent predictor of mortality.

**Methods:** This study was conducted at Chemical Pathology, Department of Pathology and Laboratory Medicine, Aga Khan University (AKU), Karachi. Medical records of all in-patients including both genders, and all age groups with documented COVID-19 from 1st March to 10th August 2020 were reviewed. The subjects were divided into two categories severe and non-severe COVID-19; and survivors and non-survivors. The details were recorded on a pre-structured performa. Between-

group differences were tested using the Mann–Whitney's U-test. The receiver operating characteristic curve was plotted for ferritin 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 157 were included in the final analysis including 108 males and 49 females. Statistically significant difference in ferritin was found in the two categories based on severity and mortality. Binary logistic regression showed ferritin to be an independent predictor of all-cause mortality supplemented with an AUC of 0.69 on ROC analysis.

**Conclusion:** Serum ferritin concentration is a promising predictor of mortality in COVID-19 cases.

**1.12 The Prognostic Value of Serum Procalcitonin in COVID-19 Patients:**
*Nawazish Zehra, Sibtain Ahmed, Lena Jafri, Zahra Hoodbhoy, Imran Siddiqui.*
*\* Section Chemical Pathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** The aim of this review is to study the published literature on the prognostic role of serum Procalcitonin (PCT) in COVID-19 cases in a homogenous group of COVID-19 patients.

**Data retrieval:** We systematically reviewed the literature available on PubMed, MEDLINE, Lit Covid NLM and WHO: to assess the utility of PCT in prognosis of Coronavirus disease. Two investigators independently identified eligible studies and extracted data. We included original studies that assessed the prognostic value of serum PCT levels in predicting severity of adult COVID-19 patients. The quality of evidence was assessed by evaluating the risk of bias in all the studies included using Quality in Prognosis Studies (QUIPS) tool. Results were reported as narrative syntheses.

**Results:** Out of the total 426 citation fifty-two articles passed through screening and were included in the review. Methodological quality of included studies was assessed and found acceptable. Overall, the aggregate study population included a total of 15296 patients with COVID-19 in whom serum PCT levels were used to predict severity. Majority of the studies were from China

i.e. 40 (77%). The PCT cut off utilized was 0.05 ng/ml by 18 (35%) studies, followed by 0.5 ng/ml by 9 (17.5%). Eighty five percent (n=44) studies reported statistically significant association (p-value<0.05) between PCT and severity.

**Conclusion:** PCT appears as a promising prognostic biomarker of COVID-19 progression. The marker can provide invaluable information if considered within the clinical context.

**1.13 Prognostic Utility of Baseline 25-Hydroxy Vitamin D levels in COVID-19 Hospitalized Patients-Hope or Hype?**
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**Introduction:** Owing to the previous experiences and knowledge of respiratory viral diseases in close genetic proximity to COVID-19, 25-Hydroxy Vitamin D (25-OH-D) has been widely utilized as a potential strategy to prevent COVID-19 alongside its inclusion in the battery of biochemical work up, specially hospitalized patients as a prognostic tool. The aim of this study was to evaluate the association of 25-OH-D with severity of infection and mortality.

**Material and Methods:** The study was conducted in section of Chemical Pathology, Pathology & Laboratory Medicine, Aga Khan Hospital, Karachi. After exemption from the ethical review committee of the Aga Khan University Karachi, we retrospectively reviewed the data from the electronic health records of PCR test proven COVID-19 in patients, to evaluate the association of 25-OH-D with severity of infection and mortality from March 1 to August 10, 2020. Result analysis was done using SPSS version 22.

**Results**: A total of 239 COVID-19 in-patients, 25-OH-D test was undertaken within 24 hours of admission in only 11 (4.7%), with a male predominance (n=7). Taking 30 ng/ml as the cut off for 25-OH-D deficiency, 8 (73%) were found deficient. The data was split into two categories based on severity and survival. The two quantitative variables (age and 25-OH-D) were compared between groups using t-test and Mann Whitney U test respectively. Increasing age was the only variable associated with severity of infection (p-value=0.05), whereas no significant differences were noted for 25-OH-D in the two

categories. From a laboratory test requisition perspective, only 4.7% had baseline test requested amongst COVID-19 cases.

**Conclusion:** Contrary to the claims that 25-OH-D is associated with disease progression, including some recommending potentially toxic doses, no significant utility of 25-OH-D exists. However, large scale longitudinal studies are required to establish its role, it is too early to recommend its inclusion in the standard biochemical workup of COVID-19 cases.

**1.14 Serum Protein Electrophoresis Patterns in COVID-19- A Case Control Study**
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**Background:** The main focus of laboratory findings in coronavirus disease (COVID-19) remained on lymphopenia, elevated D-dimer, lactate dehydrogenase (LDH), C-reactive protein (CRP), and ferritin. However, this study evaluated the pattern of Serum Protein Electrophoresis (SPEP) findings in COVID-19 cases versus negative controls.

**Material & Methods:** This study was conducted at the section of Chemical Pathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Pakistan. A data mining of integrated laboratory management system was performed and those cases with a COVID-19 by real-time reverse-transcriptase polymerase chain reaction of nasopharyngeal swabs and serum protein electrophoresis analyzed from May to October 2020 were included. SPEP was performed using inter lab G26. Frequencies and percentages were calculated for quantitative variables and descriptive analysis was done for SPEP results. SPSS version 19 was used for data analysis.

**Results:** A total of 17 COVID-19 cases with SPEP and 17 negative controls with SPEP were included. There were 8 females and 9 males in each group. The mean age of cases was 60 +/- 15 years while controls was 64 +/- 14 years. Amongst the COVID-19 positive group a newly identified monoclonal spike was noted in 7 cases whereas hypoalbuminemia, hypoalbuminemia with increase alpha fraction and no significant abnormality was noted in 3, 2 and 5 cases respectively. While in the control group no significant abnormality, hypoalbuminemia, hypoalbuminemia with increase alpha fraction, hypoalbuminemia with hypergammaglobulinemia,

hypergammaglobulinemia and increased alpha fraction was noted in 6, 4, 1, 4, 1 and 1 cases respectively.

**Conclusion:** A high percentage i.e. 42% (n=7) newly defined cases with M-spike pointing towards a monoclonal gammopathy in COVID-19 group suggests these perturbations of immunity and coagulation have the potential to impact the clinical trajectory of COVID-19 and there remains a need to be examined with large-scale data.

## 1.15 Accuracy and Comparison of Core Needle Biopsy Diagnoses with Excision Specimen Diagnoses in Fibroepithelial Lesions of Breast

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**Background:** Breast lump is the commonest symptom with which patients present in breast clinic. Fibroepithelial lesions (FEL) of the breast include fibroadenoma (FA) and phyllodes tumor (PT). PT are related with recurrence and warrants an excision with safe margins. Therefore, both tumors need to be distinguished from each other. The aim of our study was to assess the accuracy of core needle biopsy (CNB) diagnosis of FA and PT by comparing it with diagnosis on subsequent excision specimen.

**Materials and methods**: At total of 166 cases of FEL of breast who underwent CNB and subsequent complete excision between January 2001 and December 2019 were included in our study. Microscopy glass slides of these cases were blindly and independently reviewed for diagnoses by two pathologists.

**Results:** 125 (75%) were reported as a definite diagnosis on CNB and 41(25%) cases were reported as fibroepithelial lesion/biphasic lesion with no clear demarcation between FA and PT. On CNB, 76 cases were diagnosed as FA and 49 cases as PT while 110 cases were diagnosed as FA and 56 cases as PT on excision. Among 125 cases which were characterized on CNB, the diagnoses on CNB and on subsequent excision biopsy were concordant in 113 (90.4%) cases. Among 12 cases with discordant diagnoses, 3 (25%) cases diagnosed as FA on CNB were diagnosed as PT on excision. Tumor size in these cases was 6 cm, 12.5 cm and 17.5 cm. Nine (75%) cases diagnosed as PT on CNB were diagnosed as FA on excision.
In 23 cases, PT were further categorized into benign, borderline and malignant categories on CNB. One out of 8 benign PT on CNB was upgraded to borderline PT on

excision specimen. One out of 14 borderline PT on CNB was upgraded to malignant PT and another case was downgrade to benign PT on excision specimen.
Overall diagnostic accuracy of fibroepithelial lesions on CNB is 90.4% with sensitivity 89% and specificity 93%. Positive predictive value was 96% and negative predictive value was 81.6%.
**Conclusio**n: CNB shows good accuracy and overall good concordance with diagnoses made on excision specimen.
• All cases which were underreported as FA on CNB were more than 5 cm in size. Therefore, one should always think about the possibility of PT in tumor measuring >5cm in size.
• Improving diagnostic accuracy of CNB is likely to be best achieved by increasing number of cores and correlating with radiological findings and treating surgeon.

## 1.16 Evaluation of the Efficacy of Commercially Available Hand Sanitizers by Two Laboratory Methods: Experience from a Quality Control Lab in Karachi.

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**Introduction:** Use of effective hand sanitizers is one of the proven ways to achieve antisepsis thereby preventing the spread of infection via direct contact. In recent time, large amount of sanitizers, owing to the COVID-19 pandemic, are commercially available in the market often times with no proven efficacy. Consumption of suboptimal and under tested sanitizers may give false security of infection prevention.

**Objective:** Of our study was to evaluate the anti-microbial efficacy of commercially available hand sanitizers.

**Materials and Methods:** We tested the efficacy of seven commercially available hand sanitizers in reducing the growth of microorganisms by two different methods namely fingertip and membrane filtration method. This study was conducted in the Quality control section of the Microbiology laboratory, Aga Khan University Hospital. ATCC strains of five microorganisms: Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Bacillus species and Candida albicans were used. 0.5 McFarland inoculum of each microorganism along with 1/10th dilution in sterile water was prepared. In fingertip method after hand washing, inoculated colonies from the

microorganisms and their dilutions were applied to the fingertips and after hand sanitization with each of the test sanitizers after 20 seconds and 60 seconds fingertips were applied to the culture media. Membrane filtration method was also performed on sanitizers and the respective dilutions for efficacy testing.

**Results:** By fingertip method, six of the seven sanitizers tested showed no growth after 20 and 60 seconds of exposure whereas, one sanitizer showed growth of all the control organisms after 60 seconds of exposure. Only three sanitizers could be tested using membrane filtration method as the viscosity of testing gels damaged the filtration membrane. None of the tested sanitizers showed any growth.

**Conclusion:** Quality control testing of the efficacy of hand sanitizers by easily employed and time saving laboratory methods is an efficacious measure in a cost-effective setting for infection prevention.

**1.17    Evaluation of a real time Polymerase Chain Reaction (PCR) assay for detection of Pneumocystis jirovecii in bronchoalveolar lavage (BAL) specimens**
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**Introduction:** Pneumocystis jirovecii opportunistically infects immunocompromised patients resulting in serious infections such as pneumonia. Microscopy of specimens using Giemsa stain, Silver stain and immunofluorescent stain (IFA) had been the mainstay of diagnosis. These staining methods had low sensitivity and therefore Pneumocystis Pneumonia (PJP) is now being increasingly diagnosed using PCR. Since June 2018, PCR has replaced IFA at the Aga Khan University clinical laboratories. We wanted to evaluate the difference in the rate of case detection between the two techniques and reviewed clinical characteristics of patients referred for PCR testing.

**Methods:** Aga Khan University Hospital clinical laboratories data was retrospectively reviewed from 2016 to June 2018 for IFA and prospectively from June 2018 to March 2020 for PCR. 877 samples were tested for PJP using either IFA or PCR and all of these were included in this study.

**Results**: 563 BAL, tracheal aspirate, and induced sputum samples were tested using IFA, of which 2.93% were positive. 314 BAL samples were tested using PCR, of which 18.94% were positive. This represents an increase of 6.46 times in the rate of detection of positive cases. Clinical data was available for 128 patients (44 PCR positive), of which 14 (10.9%) had Diabetes Mellitus, 12 (9.4%) had HIV, 10 (7.8%) had autoimmune conditions, 27 (21.1%) had a malignancy, 3 (2.3%) had a positive AFB culture, and 9 (7.0%) had a positive GeneXpert.

**Conclusion:** This difference is due to the change in the diagnostic method, as the criteria for referral for diagnostic testing of PJP remained the same over both study periods. Our results are in concordance with other similar studies. Clinical laboratories in Pakistan should consider upgrading PJP testing methodology to PCR.

**1.18    Point of Care Testing and COVID-19: Initial Arterial Blood Gases and Patterns in Severely Ill COVID-19 Patients.**
*Nawazish Zehra, Muhammad Abbas Abid, Sibtain Ahmed, Lena Jafri, Aysha Habib Khan.*
*\* Section Chemical Pathology, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Introduction:** COVID 19 has been declared as pandemic since February 2020. As the pandemic grew at an exponential rate, hospitals and specially ICUs were under extreme burden to manage COVID-19 patients. We aim to explore the patters of ABGs in severely ill COVID-19 patients using bedside Point of Care Testing (POCT) for quick analysis and whether there is a correlation between deranged Arterial Blood Gases (ABGs) at initial presentation and severity of COVID-19.

**Methodology:** We retrospectively analyzed the clinical laboratory data of 107 patients who were admitted to ICU due to COVID-19 diagnosis in Aga Khan University Hospital (AKUH), Karachi, Pakistan between April and June 2020. Baseline values of ABGs were measured using Point of Care Testing. Subjects were divided into a mortality group and a discharged group, based on the final outcome. Univariate and multivariate analysis was carried out to identify patterns and detect if any correlation exists between ABG levels and disease severity and mortality.

**RESULTS:** Mean pH, pO2, pCO2, HCO3 and sO2 was 7.35, 100.32 mmHg, 36.56 mmHg, 21.62 mEq/L and 90.74%, respectively. The mortality rate was 34.58% (n=37). In the discharged group, mean pH, pO2, pCO2,

HCO3 and sO2 were 7.37, 95.1 mmHg, 36.14 mmHg, 22.33 mEq/L and 91.26%, respectively, while they were 7.31, 110.17 mmHg, 37.54 mmHg, 20.19 mEq/L and 89.39%, respectively in the mortality group.

**Conclusion:** POCT provides a feasible, rapid and portable testing option. Initial ABG values of severely ill COVID-19 patients in the ICU can be used for effective management and treatment planning.

### 1.19 A case of pleomorphic adenoma of the parotid gland in a patient of Nodular Sclerosis Classical Hodgkin lymphoma.

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**Background & objectives:** Hodgkin lymphomas are group of lymphoid tumors whereas pleomorphic adenomas are benign mixed salivary gland tumors. Malignant lymphomas have a frequent appearance in the head and neck region, however malignant lymphomas of the parotid region are relatively rare.

**Methods:** Representative specimens were sent from Neck mass/parotid swelling and enlarged neck nodes from right and left side of neck. Gross sectioning and subsequent microscopic examination were performed.

**Results:** Sections examined from Parotid gland (left side primary tumour) shows a neoplastic lesion composed of epithelial component in a myxoidy background consistent with pleomorphic adenoma. Sections examined from Left Neck level lymph nodes reveal lymph nodes exhibiting effaced architecture. The lymphoid population is predominantly composed of lymphocytes, histiocytes, plasma cells and occasioal eosinophils and neutrophils. Scattered large atypical mononuclear cells and few Reed Sternburg like cells are also seen. Areas of sclerosis and occasional fibrous septae are also present. These cells were positive for
immunohistochemical stains CD30 and CD15. These findings were consistent with Nodular sclerosis classical Hodgkin lymphoma.

**Conclusion:** We report a rare case of Pleomorphic adenoma in a patient of Nodular sclerosis classical Hodgkin lymphoma; Large scale surveillance studies are suggested to truly establish and quantify the risk for development of Pleomorphic adenoma in patients

suffering from Nodular sclerosis classical Hodgkin Lymphoma.

### 1.20 A case report of scrotal sebaceous carcinoma with carcinoma-in-situ

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**Background & objectives:** Sebaccous carcinoma is a malignant cutaneous neoplasm of sebaccous gland, commonly seen in the ocular area but extra ocular tumours are also seen. Carcinoma in-situ is usually seen in periocular lesions however these changes are not seen in extraocular sites.

**Methods:** Representative specimens were submitted for permanent paraffin sections from multiple sites of the patient viz. left arm, right arm, lower abdomen, penile shaft and scrotum. Gross examination showed multiple hypopigmented lesions, then subsequent microscopic examination was performed.

**Results:** Sebaceous carcinoma with carcinoma- in-situ component was reported in scrotal tissue whereas, Sebaceous adenoma was diagnosed in specimens from right arm, left arm and lower abdomen and viral wart changes were identified in tissue from penile shaft.

**Conclusion:** We report a rare case of Sebaceous carcinoma with in-situ component in scrotum. The periocular lesions often show a pagetoid or carcinoma-in-situ change, such changes are usually not seen in extraocular cases. Hence, we conclude that Sebaceous carcinoma should be considered as a differential entity while examining adnexal lesions from the perineal area. Further case evidence and surveillance studies are required from around the world to ascertain the epidemiological significance.

### 1.21 Evaluation of subclinical Arbovirus infection in healthy donors in Southern Pakistan.

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**Introduction:** Blood transfusion is a life-saving intervention that has an essential role in patient management within health care systems. The

establishment of systems to ensure that all donated blood is screened for transfusion-transmissible infections is a core component of every national blood program. While routine screening of blood donors for HIV, Hepatitis B & Hepatitis C infections is being carried out globally, screening for Arbovirus infections is not being conducted especially in regions where these infections are endemic and where epidemic outbreaks are increasing.

The scarcity of screening data and case reports from Pakistan points to a significant gap in knowledge regarding the risk to blood safety by these infections. Hence, in this study we randomly selected healthy blood donors from a tertiary care hospital blood bank in Southern Pakistan and screened them for Arbovirus infections.

**Materials & Methods:** 360 healthy blood donors were screened for the presence of IgM antibodies against Dengue, West Nile, Chikungunya, Japanese Encephalitis and Zika virus using ELISA method, over a period of one year in the Blood bank, Department of Pathology & Lab Medicine, Agha Khan University Hospital. Real-time PCR was also performed on all the samples.

**Results**: Out of 360 blood donors, 3.9% (n=14) were positive for Dengue virus infection, 3.9% (n=14) were positive for West Nile virus infection, 1.1% (n=4) were positive for Chikungunya virus infection, 0.28% (n=1) were positive for Japanese Encephalitis virus infection and none were positive for Zika virus infection. None of the samples were found to be positive with Real-time PCR.

**Conclusion:** Our screening study suggests that Arbovirus infections pose a significant risk to blood safety and therefore, routine screening of healthy blood donors for these infections should be made a mandatory component of every transfusion program worldwide.

**1.22 Serum Electrolyte Patterns and Prognosis Using Point of Care Testing in Severely Ill COVID-19 Patients**
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**Introduction:** Identification and early detection of parameters that define the disease course of COVID-19 is critical. Point of Care Testing (POCT) provides rapid and portable testing option in ICU patients. We aim to see if POCT for serum electrolytes in COVID-19 patients follows a pattern and whether it can be used as a predictor of disease course and mortality in severely ill COVID-19 patients.

**Methods:** Retrospective data was analyzed of 43 patients admitted to COVID-19 ICU at Aga Khan University Hospital, Karachi, Pakistan between April to June, 2020. Initial POCT testing, done on bedside at admission, was used as baseline. Subjects were divided in to a mortality group and discharged group based on final outcome. Univariate and Multivariate analysis was used to identify patterns and find a correlation between serum electrolytes and mortality.

**Results:** Mean sodium, potassium and chloride levels at initial presentation were 141.91 mEq/L, 3.56 mmol/L and 101.34 mEq/L, respectively. Mortality rate was 51.2% (n=22). In the mortality group, the means for sodium, potassium and chloride were 143.92 mEq/L, 3.62 mmol/L and 102.98 mEq/L, respectively, and 139.47 mEq/L, 3.50 mmol/L and 99.48 mEq/L, respectively in the discharged group.

**Conclusion:** POCT is an effective tool to measure baseline electrolytes in severely ill COVID-19 patients. It provides easy, rapid and bedside testing opportunity and helps identify electrolytes pattern and disease course in COVID-19 patients.

**1.23 Concordance between phenotypic resistance to fluoroquinolones and gyrA mutations among rifampin-resistant isolates of Mycobacterium tuberculosis complex from Pakistan**
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**Background:** Fluoroquinolones (FQ) are the cornerstone of treatment for Rifampicin Resistant (RR TB). Here we investigate whether FQ resistance detected by line probe assay (LPA) shows good concordance with phenotypic susceptibility testing.

**Methods:** Mycobacterium tuberculosis isolates were collected from clinical samples received in clinical microbiology laboratory, Aga Khan University, Karachi between 2016 and 2017. RR TB isolates grown in culture and resistant to ofloxacin (OFX) were selected. Minimum inhibitory concentrations (MICs) were performed for levofloxacin (LEV), moxifloxacin (MXF) and OFX using pre-prepared frozen plates (Thermo Fisher Scientific Inc.,

194 Waltham, MA, USA). DNA was extracted using Genolyse® extraction kit (HAIN life sciences, Germany). For detection of mutations, line probe assay Genotype MTBDRsl version 2 (HAIN Lifesciences, Germany) was used.

**Results:** From 51 MDR TB stains that were included, majority of patients (n=29, 56.9%) were from Punjab province, 35.3% from Sind province (n=18), and 5.9 %( n=3), and 1.9% (n=1) from Khyber Pakhtunkhwa and Balochistan respectively. Concordance between genotypic resistance detection by LPA, and phenotypic resistance detection by MICs to FQ (any one of OFX, LEV, or MXF) was observed in 84.3% isolates (n=43). The most common mutation identified was D94G in the gyrA gene in 50.9% of isolates (n=26). No gyrB mutations were detected. MIC testing showed high level of cross resistance between LEV/OFX and MFX MICS, with only 11/51 (21.6%) LEV/OFX resistant strains demonstrating MFX MICS of <1 µg/ml.

**Conclusion:** LPA method is a rapid and reliable method to identify resistance to FQ in MTB. However, for determination of susceptibility to individual FQs, further testing should be performed via phenotypic methods for confirmation.

### 1.24 Frequencies of different patterns of direct anti-globulin test (DAT) in patients with autoimmune haemolytic anaemia at tertiary care hospital in Karachi

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**Introduction:** The direct antiglobulin test (DAT) is used to detect immunoglobulin and/or complement on the surface of red blood cells (RBCs). The DAT is valuable in the investigation of autoimmune haemolytic anaemia, drug-induced immune haemolysis, haemolytic transfusion reactions, and passenger lymphocyte syndrome. Autoimmune haemolytic anaemia (AIHA) results from red cell destruction due to circulating autoantibodies against red cell membrane antigens. Warm AIHA (WAIHA) represents 60% of AIHA cases and is associated with the positive detection of IgG and C3d in the direct antiglobulin test (DAT). A positive direct antiglobulin test (DAT) is the hallmark of diagnosis for AIHA. The aim of the study was to determine the frequencies of different patterns of direct anti-globulin test (DAT) in patients with autoimmune haemolytic anaemia.

**Objective:** To determine the frequencies of different patterns of direct anti-globulin test (DAT) in patients with autoimmune haemolytic anaemia at tertiary care hospital in Karachi.
**Study design:** Descriptive Cross Sectional
**Setting:** Section of Haematology and Transfusion medicine, Department of Pathology & Laboratory medicine, Aga Khan University Hospital, Karachi.
**Duration:** January 1, 2015 to December 31, 2019

**Material & methods:** A total of n=138 patients from in & out-patients of autoimmune haemolytic anaemia meeting the inclusion criteria were enrolled in the study. Blood sampling: Venous blood is drawn and collected in ethylenediaminetetra-acetic acid (EDTA) containing evacuated (vaccutainer) tubes after cleaning with 70% isopropanol and allowed drying spontaneously before being punctured. Direct antiglobulin test: is performed by taking two test tubes and labeling each for test sample and control respectively followed by dispensing one (01) volume (drop) of 02% to 05% red cell suspension into each of the tube. Immediately two drops of Polyspecific/Monospecific (anti-IgG or anti-complement (C3d)) antihuman globulin antisera are added, mixed and then centrifuged for 15 to 20 seconds at 1000g.

**Results:** A total of 138 patients of either gender from age 13 to 70 years were recruited in the study. The mean age of the patients in this study was 43.71±16.48, ranging between (13-70) years and the median age was calculated to be 45 years. Female patient numbered 88(64%) were more predominant than male patients which numbered 50(36%). The age was stratified in to two groups out of which most of the patients were more than or equal to forty-five years, and accounted for 73(52.9%), whereas only 65 patients (47.1%) lied below forty-five years of age. In all case of autoimmune haemolytic anaemia, the positivity for warm autoimmune haemolytic anaemia was found in 99 (71.7%) and that of cold autoimmune haemolytic anaemia in 39 (28.3%), respectively. No significant association was found between the pattern of warm autoimmune haemolytic anaemia and among age groups or gender (p-value>0.05). Similarly, no significant association was found between the pattern of cold autoimmune haemolytic anaemia and among age groups or gender (p-value>0.05).

**Conclusion**: Out of 138 cases of autoimmune haemolytic anaemia, the pattern of positivity for warm autoimmune haemolytic anaemia was found in 99 (71.7%) cases and that of cold autoimmune haemolytic anaemia in 39 (28.3%) cases respectively. Insignificant association was

found between the pattern of warm and cold autoimmune haemolytic anaemia and different age groups or gender (p-value>0.05).

### 1.25 Embryonal tumor with multilayered rosettes (ETMR).

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**Background & objectives:** The 2016 update of the WHO Classification of Tumors of the CNS has redefined a number of tumors. Embryonal Tumor with Multilayered Rosettes is a recently described pathological entity. They are rare tumor affecting young children. Prognosis is extremely poor.

**Methods:** We retrieved and reviewed H&E stained microscopy glass slides of 13 ETMR cases with history of headache, vomiting and pain. These cases were treated at different institutes and diagnosed at our institute between March 2008 and July 2019. Morphologic features such as presence of papillary/tubular-trabecular architecture, surface blebs, external blebs, primitive cell component, neuronal, glial and mesenchymal differentiation were assessed.

**Results:** Patients' age ranged from 8 months to 10 years with median of 3.63 years. Female to Male ratio was 3:2. Brain was the most commonly involved site.
Most of the tumors were received in multiple pieces. All the cases showed features of malignancy. Follow-up of 6 patients could be attained and 3 were found to have expired due to some undiagnosed disease rest were all healthy with 2 weeks follow up history. Treatment of all patients was excision alone with few patients who received radiotherapy.
Microscopically, as presence of papillary/tubular-trabecular architecture, surface blebs, external blebs, primitive cell component, neuronal, glial and mesenchymal differentiation was observed in all cases.

**Conclusion:** ETMR are a distinct entity with majority of them behaving aggressively even after being treated by local excision. Although the WHO currently recognizes 3 distinct histopathological entities-embryonal tumors with abundant neuropil and true rosettes, ependymoblastoma and medulloepithelioma. Recent studies indicate that these tumors have a common molecular profile and clinical course and that they are now classified as a single entity.

### 1.26 Concomitant Bifocal Kaposi sarcoma with tubular adenoma and hyperplastic polyp in a background of ulcerative colitis.

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**Introduction:** Kaposi sarcoma is a Human Herpes Virus-8 associated vascular neoplasm characterized by disorganized spindle cell growth with formation of erythrocyte containing clefts. Incidence rate approaches 50% in immunocompromised individuals. Occurrence as primary colonic neoplasm is very rare and much rarer is presence of concomitant polyps.

**Material and Methods:** Here, we present the case of a 36 years male who was a known case of ulcerative colitis with long term immunosuppressive therapy and developed complications of steroid use. Total proctocolectomy was done. Grossly total proctocolectomy specimen received comprising of terminal ileum to rectum measures 48 x 6 cm. One pseudopolyp is identified in transverse colon. One polyp is identified in descending colon mg 1.5 x 1.3 cm. 04 polyps are identified in rectum larger mg 2 x 1 cm.

**Results:** Microscopy of desceding colon polyp and smaller rectal polyp revealed a fascicular spindle cell lesion in submucosa with extravasated red blood cells and frequent mitoses. Cells demonstrated positive expression of CD31, ERG and focal HHV-8 positivity. Section from larger rectal polyp shows features of tubular adenoma and sections from transverse colon polyp shows hyperplastic polyp. Rest of the bowel shows features of ulcerative colitis.
Conclusion: Kaposi sarcoma with coexistent polyps of different types in ulcerative colitis is extremely rare. Immunosuppression with inflammatory bowel disease predisposes to the development of KS.

### 1.27 Novel presentation of COVID positive patient with pulmonary embolism

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**Introduction:** The current pandemic of coronavirus disease 2019 (COVID-19) is challenging the health care providers to clinically identify the signs, symptoms,

underlying pathology, and available treatment options to cope with the related mortality rate. Sepsis can lead to a hypercoagulable state with Elevated D-dimer levels which are not the only indicator of the severity of CoV pneumonia but also associated with increased risk of pulmonary embolism. Coagulopathy is very common in sepsis, hence increasing the like hood of pulmonary embolism which can lead to severe outcomes of CoV.

**Case Report:** A 34-year-old man presented to emergency department on 17th June 2020, complaining of acute retrosternal chest pain associated with shortness of breath and dizziness for 12 days, he also mentioned a recurrent calf muscle pain during walking for 3 days. There was no any significant past medical or surgical history. On chest examination patient had bilateral equal air entry and harsh vesicular breathing with sinus tachycardia. Oxygen saturation of 88-89 mmHg in room air was noted which build up to 95 mmHg with nasal oxygenation. A decision was taken to perform an urgent CT scan of Pulmonary artery (CTPA) after renal function were checked and found to be normal. CTPA reveals a large filling defect in main pulmonary artery extending to right and left trunks representing a saddle shaped thrombus but the patient was stable hemodynamically. Mild fever was recorded so a nasopharyngeal swab was taken for PCR COVID-19 and got a positive result. Patient developed boot of respiratory distress and desaturation because of showers from lower limb that is swollen and tender and highly probable to have deep venous thrombosis (DVT) as a source of pulmonary embolism (PE). Patient was immediately admitted in intensive care unit and started on full therapeutic anticoagulation for few days then started on oral anticoagulant to target INR 2.5-3.5.

**Learning Points:** Based on scientific reasoning most of the literature suggested prophylactic use of a high dose of LMWH in all COVID-19 patients irrespective of the severity of the disease can help in the prevention of thromboembolic events but till date, no randomized control trial have proven this association.

**Conclusion:** In condensation patients admitted with vague symptoms of cardiac and coagulation diseases should be tested for COVID-19. All the patients with suspicion of CoV should be monitored closely for the development of thromboembolic conditions. Low molecular weight heparin should be used as prophylaxis, in absence of contraindications.

### 1.28    Sinonasal Glomangiopericytoma: A morphological and immunohistochemical analysis of 13 cases

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**Background:** Sinonasal Glomangiopericytoma (SNGP) is an uncommon low-grade vascular neoplasm that has a wide differential diagnosis. Owing to its rarity, it can pose undue usage of Immunohistochemical markers and delay. **Method:** We present a series comprising 13 cases arising from the nasal cavity. The tumors were retrieved to study morphological features and understanding supportive immunohistochemical markers.

**Results.** The patient ranged in age from 3 months to 80 years old, average being 52.92 years. Gender wise distribution was 9 males and 4 females. The tumor is characterized by syncytial sheets of uniform, spindle to oval myoid cells having eosinophilic cytoplasm and uniform nuclei. Interspersed is prominent vasculature of ectatic vessels surrounded by perivascular hyalinization. Although these features are consistently present, one can have encounter varied differences too that include myxoid change, fibrosis, mast cells, Inflammatory cells, eosinophils, extravasated RBCs, multinucleated giant cells. Mitotic figures were 1/10 HPF and none of the cases had necrosis. Immunohistochemically, this neoplasm was positive for Vimentin (100%), smooth muscle actin (100%), CD34 (61%), Cyclin D1 (100%) and Beta catenin (75%). Cytokeratins, EMA, STAT6, Myogenin, Desmin, SOX10 showed negative results. Mitotic figures were 1 / 10 HPF. All the tumors were treated with wide surgical excision.

**Conclusions.** Our data suggest that SNGP is low grade neoplasm with indolent behavior. A larger differential diagnosis along with a carefully tailored Immunohistochemical panel can lead to correct diagnosis.

**1.29 Early onset disease versus late onset disease in neonates with candidemia from Pakistan**

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**Introduction:** Candidemia leads to high morbidity and mortality especially in premature neonates from developing countries. We studied the spectrum of neonatal candidemia and determined if the proportion of non-C. albicans candida species candidemia in this patient population has increased in the past 6 years which has not been extensively investigated in Pakistan.

**Methods:** A cross-sectional study was conducted at the Aga Khan University, Karachi, Pakistan. Cases (neonates with candidemia) were identified from laboratory database for year 2014-2018, and for 2019 data was collected prospectively from laboratory during routine reporting of cultures at which time clinical information was gathered from the patient's physician/guardian. Study was conducted after obtaining exemption from the ethical review committee.

**Results:** A total of 669 neonates with candidemia were identified, out of these 346 neonates had EOD (age $\leq 7$ days) while 323 had LOD (age >7 days). Mean age of neonates with EOD and LOD was 3.7 and 16.1 days, respectively. The isolation of non-C. albicans candida species causing infection was significantly higher as compared to C. albicans (p-value 0.024). LOD in neonates was more likely to occur with use vancomycin (COR 3.89, 95% CI 1.39-10.89. EOD was more likely in patients with vaginal delivery (COR 4.16, 95% CI 1.42-12.23) and neonates with respiratory distress as a cause for ICU admission (COR 3.31, 95% CI 1.05-10.42), after adjusting for extremely preterm neonates with gestational age of <28 weeks.

**Conclusion:** The trends for isolation of C. species in neonates showed a trend with C. tropicalis being most common C. species during the recent years. Despite infrequent isolation of C. glabrata and C. krusei, amphotericin remains first line option for neonatal candidemia.

**1.30 The Association of Chest Radiographic Findings and Severity Scoring with Clinical Outcomes in Patients with COVID-19 Presenting to the Emergency Department of a Tertiary Care Hospital in Pakistan**

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**Introduction:** While chest x-rays (CXRs) represent a cost-effective imaging modality for developing countries like Pakistan, their utility for the prognostication of COVID-19 has been minimally explored. Thus, we describe the frequency and distribution of CXR findings, and their association with clinical outcomes of patients with COVID-19.

**Methods:** All adult ($\geq$ 18 years) patients presenting between 28th February-31st May to the emergency department of a tertiary care hospital in Pakistan, who were COVID-19 positive on RT-PCR with CXR done on presentation, were included. A CXR Severity Score (CXR-SS) of 0-8 was used to quantify extent of pulmonary infection on CXR, with a score of 0 being negative and 1-8 being positive. The patients' initial CXR-SS and their highest CXR-SS over the hospital course were used for analysis, with cut-offs of 0-4 and 5-8 being used to assess association with clinical outcomes.

**Results:** A total of 150 patients, with 76.7% males and mean age 56.1 years, were included in this study. Initial CXR was positive in 80% of patients, and 30.7% of patients had an initial CXR-SS between 5-8. The mortality rate was 16.7% and 30.6% patients underwent ICU admission with intubation (ICU-Int). On multivariable analysis, initial CXR-SS (1.355 [1.136-1.616]) and highest CXR-SS (1.390 [1.143-1.690]) were predictors of ICU-Int, and ICU-Int was independently associated with both initial CXR-SS 5-8 (2.532 [1.109-5.782]) and highest CXR-SS 5-8 (3.386 [1.405-8.159]). Lastly, age (1.060 [1.009-1.113]), initial CXR-SS (1.278 [1.010-1.617]) and ICU-Int (5.047 [1.731-14.710]) were found to be independent predictors of mortality in our patients.

**Conclusion:** In a resource-constrained country like Pakistan, CXRs may have valuable prognostic utility in predicting ICU admission and mortality. Additional research with larger patient samples is needed to identify to further explore the association of CXR findings with clinical outcomes.

**1.31 Invasive and semi-invasive infections with Fusarium species from Pakistan; data from a tertiary care hospital laboratory, Karachi, Pakistan.**
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**Introduction/ Objective**: Fusarium species belong to the group of hyaline fungi characterized by formation of conidia in clusters. They should be promptly identified as they are an important cause of invasive and semi invasive hyalohyphomycotic in immunocompromised patients. The objective of this study was to determine the frequency of invasive and semi-invasive fusariosis from a tertiary care hospital laboratory in Karachi, Pakistan.

**Materials & Methods:** Cases of invasive fusariosis were identified from Aga Khan University laboratory database from 2011-2014. Clinical significance of the fungi was assessed based on clinical history, radiological assessment and culture positivity from a sterile tissue/site. All isolates were identified using morphological identification. This information was retrospectively entered, and descriptive analysis was performed using MS Excel 2013.

**Results:** Seventeen cases were reviewed out of which ten cases were males and seven females. Four cases were younger than 50 years, eleven between 50 -70 years and two cases were older than 70 years. In six cases, history of risk factors and clinical outcome were not available. Of the eleven cases where the relevant clinical records were available, four cases had Diabetes mellitus, three cases had prolonged corticosteroid use, two cases were on anticancer chemotherapy for known malignancies and two had no apparent risk factors. During the course of illness, six cases had a prolonged hospital stay, four required central venous lines and one case developed multiple organ failure. Amphotericin was administered either alone or in conjunction with triazole anti-fungal in ten patients, and two cases received triazole monotherapy.

**Conclusion:** Due to resistance of Fusarium species to many antifungal drugs management of these infections is very challenging. This pathogen resulted in life threatening and sight threatening infections in our cohort of patients.

## 2.0 Services

### 2.1 Stress and Anxiety among General Dental Practitioners, Specialist Dental Practitioners and Dental Surgery Assistants in Treating Dental Patients during the Coronavirus Pandemic: A Cross Sectional Survey

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**Background:** Dental professionals are at great risk of contracting the coronavirus infection. The objectives of this study were to assess stress and anxiety among dental professionals and which dental procedures cause the greatest amount of stress and anxiety during the coronavirus pandemic.

**Materials and Method:** This cross-sectional survey was conducted in August 2020 by requesting voluntary participation by dental healthcare workers through our e-form which consisted of our self-developed questionnaire, the Perceived Stress Scale (PSS), and Generalized Anxiety Disorder Scale (GAD). Simple and multiple linear regression analysis was used to assess dental procedures and other factors associated with stress among participants. A p-value $\leq 0.05$ was considered as statistically significant.

**Results:** This survey included 85 participants (32 males, 53 females) with a mean age of $31.6 \pm 6.0$ yrs. Significant associations were found between severe stress for scaling (p< 0.001, p< 0.001), complex fillings (p< 0.001, p< 0.001), RCTs (p = 0.001, p = 0.001), crown and bridge work (p< 0.001, p< 0.001), denture work (p = 0.001, p = 0.001), simple extractions (p = 0.043, p = 0.043), third molar extractions (p< 0.001, p< 0.001), surgical procedures (p< 0.001, p = 0.001), implant placements (p = 0.001, p = 0.022), and PSS and GAD scores, respectively.

**Conclusions:** Dental healthcare workers have severe stress and anxiety with elective dental procedures. Dental emergencies should take precedence and electivedental treatment should be deferred. Psychological support for dental healthcare professionals should be made accessible.

### 2.2 Safety and Efficacy of Convalescent Plasma Treatment in COVID-19 Patients at a Tertiary Care Center in Pakistan – COLLATE Trial

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**Introduction:** The outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) occurred initially in December 2019 in the city of Wuhan, Hubei province, China where patients mainly presented with respiratory symptoms. In Pakistan the first case was identified on February 26, 2020 and since then Aga Khan University Karachi is at the forefront of the fight against COVID-19. After receiving all required approvals, this trial was undertaken to determine safety and efficacy of transfusing convalescent plasma (CP) in patients admitted with COVID-19.

**Subjects and Methods:** This was a non-randomized, open label, phase II clinical trial with 110 cases and 34 controls recruited during April 2020 till July 2020. Convalescent plasma donors and patients who received it were recruited using donor eligibility criteria issued by U.S. Department of Health and Human Services Food and Drug Administration. All donors were screened for transfusion transmitted diseases and tested for SARS-CoV-2 infection by rRT-PCR. Documentation of IgG antibody in donors was done through Novel Coronavirus COVID-19 IgG ELISA Kits. Patients in the intervention group received 500ml of CP along with concomitant therapies. Patients in the control group received concomitant therapies only. Outcome measures included assessment of safety, decreased length of stay and decrease in values of inflammatory makers (CRP, D-Dimer, procalcitonin, serum ferritin)

**Results:** We recruited 91 males and 43 females during the study period. The median age was 60.2 years. Age was found to be a significant prognostic marker in both groups as patients less than 60 years had increased overall survival (hazard ratio: 0.33, p-value: 0.001). Presence of two or more co-morbidities provided disadvantage to the overall outcome. Survival was increased by 10 days in patients who received plasma as compared to controls. However, it was not significant. The overall survival in cases was 68% while in controls it was 62%. There was an improvement seen in all inflammatory markers after transfusion of convalescent plasma in cases. Use of concomitant therapies e.g. tocilizumab (hazard ratio: 1.09, 95% CI: 0.54 - 2.23) and methylprednisolone (hazard ratio: 1.3, 95% CI: 0.61– 2.88) did not affect overall survival. There was no serious adverse event reported after transfusion of convalescent plasma

**Conclusion:** Transfusion of CP was found to be safe as no adverse event was reported. There was a significant decrease in the inflammatory marker levels in cases. There was no significant difference in length of stay and overall survival in both groups.

**2.3    Comparative Analysis of N95 Respirators Fit Testing with Commercially Available and in House Reagent.**
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**Introduction:** COVID 19 emerged on the global arena in November 2019 in Wuhan, a city of China, since then it has created havoc in the world causing millions of infection in the population and deaths worldwide. Many healthcare workers are affected by it and lost their lives in the line of duty. For the protection of healthcare workers WHO and CDC have made standard guidelines and requirements for PPE use among healthcare workers dealing with the outbreak. N95 masks are the most readily used PPE by the healthcare professionals and it is highly recommended by OSHA that every make and model of N95 should go through a fit test at least once in a year.

**Method:** A total of 30 randomly selected healthcare professional from Aga Khan University were selected for a single blinded study conducted in April 2020, who were a regular user of the N95 respiratory masks. Threshold testing with in house reagent with three different concentrations was done prior to establish participants sensitivity to the reagent. After successful completion of threshold testing, fit testing was done on the participants wearing N95 mask. Data collection variables included participant fail or pass status with commercial reagent, fit testing solution code, sensitivity testing response for each concentration (yes or no), and number of puffs at which sensitivity was achieved, pass or fail status of fit test for each concentration.

**Result:** All the participants included in the study passed the sensitivity testing with three concentration of the reagents, while it was concluded from the results that the concentration for the in house reagent was well suited for the sensitivity testing with a concentration of 1g/dl saccharin with 10g/dl sodium benzoate and for fit testing 12g/dl was found to be more appropriate.

**2.4    Breaking Sampling Breaking sampling bottlenecks using 3D-printed nasal swabs for SARS-CoV-2 PCR testing**
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**Introduction:** SARS-CoV-2 has infected more than 100 million individuals worldwide. The causative agent of COVID-19 is best detected in upper respiratory specimens which need to be collected using a particular swab to collect samples from the nasopharynx, oropharynx or nasal cavity. One of the biggest bottlenecks for testing respiratory specimens for SARS-COV-2 has been the availability of swabs and appropriate transport medium for collection, storage and downstream testing by polymerase chain reaction (PCR) based testing for the virus. We have thus far been dependent on the import of nasopharyngeal, nasal and oral swabs with viral/universal transport medium for SARS-CoV-2 testing.

**Objective:** At AKU, we have developed and printed our own 3-D swab design for nasal (nostril) sample collection. This has been paired with a laboratory prepared universal transport medium (UTM) to store the swab for testing. We conducted a clinical validation study comparing the 3D-printed nasal swab collected SARS-CoV-2 PCR tests with the standard nasopharyngeal/nasal swab method for SARS-CoV-2. All cases were tested with informed consent at the COVID-19 testing site, AKUH or were in-patients.

**Results:** Two hundred and two individuals were tested comprising 150 symptomatic and 52 asymptomatic cases. In total there were 65 True positive and three false positive SARS-CoV-2 PCR tests. There were six false negatives and 129 True Negative samples. This gave the 3D-printed swab sampling a sensitivity of 91% and Specificity of 97.7% as compared with the standard nasal swab method.
Further, the concordance between viral load detection through (CT) values indicated a strong accuracy between 3D-printed swab and standard polyester swab sampling, in relation to diagnosis of High, Medium or Low viral load sample detection.

**Conclusions:** 3D-printed swabs can be printed at 1200 in one day and can provide a rapid, cost-effective local solution for the bottleneck of swab production for respiratory sampling of SARS-CoV-2 PCR testing. This can enhance diagnostic testing capacity across Pakistan.

## 2.5 ABO Blood group discrepancies at tertiary care hospital

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**Introduction:** ABO system is the first recognized blood group system in humans. In 1901, Karl Landsteiner showed that an individual's serum contained ABO antibodies corresponding to the antigen(s) which are lacking on his red blood cells (RBCs). The anti-A and anti-B antibodies are naturally occurring which usually appear from the age of approximately 6 months.

**Objective:** The goal of this study was to assess the frequency of ABO discrepancies which occurred during the 1-year study period.

**Materials & Methods:** This study was conducted at the blood bank of tertiary care hospital Karachi, Pakistan. All procedures performed in this study were in accordance with the ethical standards of the institution. The study was approved by the institute ethics committee. This was a retrospective, cross-sectional study. ABO typing record kept at the blood bank laboratory from January 2019 till December 2019 were reviewed. A total of 31,918 samples were included. Those samples were included in the study where discrepancy persisted after the technical errors were ruled out. Patient details including name, age and registration number were checked, for all the discrepancies to avoid repetition while data analysis.

**Results:** During the retrospective study period, a total of 31,918 patient samples were tested. We detected 53 (0.16 %) of ABO discrepancies, and their further distribution according to standard classification into group I, group II and group IV discrepancies. Of the 53 discrepant cases, 22 (41.5 %) were males, and 31 (58.5 %) were females. The overall median age for patients with ABO typing discrepancy was 24. The most common type of ABO discrepancies was weak /missing antigen (88.7 %), followed by weak/missing antibody (9 %). The most common cause of ABO discrepancies was subgroups of A (39.6 %), followed by subgroups of B (15.1 %), A subgroup B (15.1 %) and one case (1.9 %) of A subgroup B with anti-A1.
Conclusion: The overall prevalence of ABO discrepancies was 0.16% in our tertiary care hospital. The most common type of ABO discrepancies was type II discrepancy which includes subgroups of A and B (88.7 %). However, the weak subgroups of A and B identified in our study require further confirmation by molecular studies.

## 2.6 Elucidation of cellular targets and exploitation of the receptor-binding domain of SARS-CoV-2 for vaccine and monoclonal antibody synthesis

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**Introduction/Objectives:** The pandemic caused by novel severe acute respiratory syndrome coronavirus (SARS-CoV-2) has resulted in over 452 822 deaths in the first 20 days of June 2020 due to the coronavirus virus disease 2019 (COVID-19). The SARS-CoV-2 uses the host angiotensin-converting enzyme 2 (ACE2) receptor to gain entry inside the human cells where it replicates by using the cell protein synthesis mechanisms. The knowledge of the tissue distribution of ACE2 in human organs is therefore important to predict the clinical course of the COVID-19. Also important is the understanding of the viral receptor-binding domain (RBD), a region within the spike (S) proteins, that enables the entry of the virus into the host cells to synthesize vaccine and monoclonal antibodies (mAbs).

**Material and Methods:** We performed an exhaustive search of human protein databases to establish the tissues that express ACE2 and performed an in-depth analysis like sequence alignments and homology modelling of the spike protein (S) of the SARS-CoV-2 to identify antigenic regions in the RBD that can be exploited to synthesize vaccine and mAbs.

**Results:** Our results show that ACE2 is widely expressed in human organs that may explain the pulmonary, systemic, and neurological deficits seen in COVID-19 patients. We show that the S protein of the SARS-CoV-2 is a homolog of the S protein of SARS-CoV-1, and has sequences in the RBD and transmembrane segments that can serve as templates to synthesize vaccine and mAbs synthesis against SARS-CoV-2.
**Conclusion:** The Bioinformatic computational tools and effective use of microbial genome databases can help predict sequences in the host cell recognizing S protein for vaccine and mAbs synthesis against SARS-CoV-2

## 2.7 How are Laboratory Professionals Coping with COVID-19? A Virtual Survey at a Clinical Chemistry Laboratory in LMIC amidst the Peak Pandemic Months

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**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 scale of 1-5 (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.

**2.8 Influence of the Pre-Treatment Complexity and Treatment Modality on the Duration of Orthodontic Mechanotherapy at a Tertiary Care Hospital: A Cross-Sectional Study**
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**Introduction:** Adult orthodontic patients are highly concerned about the duration of treatment. The aim of this study was to evaluate influence of pre-treatment factors and treatment modalities on duration of treatment.

**Materials and Methods:** A cross-sectional study was conducted using pre- and post-treatment records of patients who underwent fixed orthodontic mechanotherapy from 2013 - 2018. A total of 90 consecutive subjects were included in the study which were distributed into short (≤ 20 months), normal (21-29 months) and long treatment duration (≥ 30 months). Pre-treatment complexity

was assessed by IOTN and PAR indices, skeletal, dentoalveolar, and soft tissue factors. The Kruskal-Wallis test was used to compare the mean difference for the duration of treatment between non-extraction (NEF), all first premolars extraction (all 4's), mandibular incisor extraction (MIE), implant intrusion (II) and molar mesialization (MM) cases. Linear regression analysis was used to quantify the influence of pre-treatment factors and treatment modality on the duration of orthodontic treatment.
**Results:** Mean duration of treatment in NEF was $24.83 \pm 6.4$ months, all 4's was $36.05 \pm 6.9$ months, MIE was $27.16 \pm 6.8$ months, II was $54.1 \pm 12.1$ months and MM was $48.2 \pm 14.2$ months. Multiple linear regression model explained 71% of the variance in treatment duration using pre-treatment complexity assessed by PAR, IOTN, AC and the adopted treatment modality.

**Conclusions:** Increase in duration of treatment was seen with an increase in the pre-treatment complexity. Treatment modalities such as maxillary arch intrusion and space closure of lower first molars were found to be significantly associated with longer treatment duration. Non-extraction treatment finished in the expected time frame.

**2.9 Trend Analysis of Lab Tests Requisitions of COVID-19 Prognostic Biomarkers at a Clinical Chemistry Reference Laboratory in South East Asia**
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**Background:** Biochemical parameters, such as C-reactive protein (C-RP), Procalcitonin (PCT), Lactate dehydrogenase (LDH) and Ferritin are associated with COVID-19 severity and prognosis. This trend analysis of COVID-19 prognostic biomarker requisitions is aimed at providing a reflection of the clinical practices adopted amidst the peak of the pandemic. This knowledge of the prognostic biomarkers utilized, will further aid to classify patients based on their risk, for optimal resource allocation and improve outcomes.

**Material & Methods:** This cross-sectional study was conducted at the clinical chemistry laboratory at the Aga Khan University Hospital (AKUH), Karachi Pakistan. A team consisting of two clinical chemistry consultants reviewed the COVID-19 prognostic biomarkers tests performance data from March to July, 2020 using the integrated laboratory information management system (ILMS). The test statistics of March to July, 2020 when COVID-19 cases were on the rise in the country were compared with those of the same months from 2019. The changes in the test groups were expressed in percentages. Microsoft Excel for windows 2019 was used for data analysis.

**Results:** The total specimens received for testing in 2020 (n= 574092) showed a percent decline of approximately (-) 33% compared to 2019 (n= 858756). Contrary to the overall decline in volumes an upward surge was noted for the prognostic biomarkers. From March to July, the highest percent change was noted for LDH (+155.1%), followed by PCT (+66.7.1%), C-RP (+26.5%) and Ferritin (+22.1%) in 2020 compared to the same time frame in 2019. The highest percent change was noted in June.

**Conclusion:** During the COVID 19 pandemic, a significant increase in utilization of laboratory services was seen for COVID-19 prognostic markers.

## 2.10 Evaluation of a portable High-efficiency particulate air (HEPA) filter for improved air quality in a patient's room

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**Introduction:** Increased rate of hospital acquired bacterial and Aspergillus spp. infections have been associated in hospitalized patients who have immune deficient status or suffer from either structural lung diseases or pre-existing viral infections like influenza and COVID-19 etc.

This study planned to evaluate the efficacy of a new portable high-efficiency particulate air (HEPA) filter machine in patient room, as a step to minimize the acquisition of hospital acquired infections.

**Methods and results:** Baseline environmental cultures (active & passive air sampling, surface swab cultures) were taken for 3 days, with room vacant & air conditioning unit functional. Disinfection of all surfaces with sodium hypochlorite solution was done. The environmental sampling was done. Next, the room air conditioning unit was serviced, followed by environmental cultures. Following this, a portable HEPA filter machine was placed in room. Final room air cultures were taken.

**Results:** Gradual reduction in mold & bacterial count was seen at various cleaning steps with greatest reduction after cleaning of room air cooling unit (90% reduction of mold count & 37% reduction of bacterial count in air).

Portable room HEPA filter was run on same day for 2 hours & air culture taken showed significant reduction in organism count (90% reduction of mold count & 53% reduction of bacterial count in air).

**Conclusion:** Portable HEPA filter provides significant reduction in mold & bacterial count. We recommend that traditionally used room air cooling units should be replaced by newer available options as per guideline recommendation. Portable HEPA filter can be utilized as a temporary solution to minimize mold & bacterial contamination in high risk patient care areas. However, its placement should be based on its air filtration capacity/facility/room ventilation type.

## 2.11 Impact of COVID-19 on Daycare Oncology Nursing Staffing at Aga Khan University Hospital, Karachi and devising a new guideline for making Zero Exposure

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**Background and Objective:** Covid-19 has become a pandemic which has affected overall population. The hospital staffs has become more affected with this pandemic while dealing with patients to whom they don't know that are COVID-19 positive. We have dealt with such conditions in Daycare Oncology Unit at Aga Khan University Hospital in which unit has suffered a lot with the staffing crunch due to exposure with positive patients. In the beginning, all health care personals were instructed to wear face mask and gowns as safety measures and were also educated to check for few of the points which makes a linked with COVID-19 symptoms. From the month of April 2020 till June 2020, Daycare Oncology Unit underwent in severe staff deficiency. Out of 27 staffs, total of 6 (22%) staffs were found COVID-19 positive and 17 (63%) staffs were quarantined intermittently due to exposure with positive patients. In such crisis, Oncology management has planned to review the guidelines with infection control to make the exposure zero for which few interventions and recommendations have been applied like one day prior confirmation calls to patients and asking for the symptoms, putting a screening desk on entrance of Ibn-e Zohar building, screening at assessment room, making a mandate to patient and attendant for wearing mask, upgrading of PPE (gowns, gloves, mask, face shields), usage of N95 mask for any aerosol generating procedures, N95 mask fit testing by Oncology Nursing Staffs and fixing of nurse patient assignments for a week.

**Results:** After applying all the safety checks, it has been observed that no exposure has been taken place after the month of June 2020 in Daycare Oncology Unit. Our 100% of the staffs have been involved in patient care which increases staff satisfaction and reduces their burden, beside we have also achieved patient satisfaction to 98%.

**Conclusion:** There was a strong need identified to make some guidelines for oncology staff and patients because oncology staffs are working on immunocompromised patients and we valued our internal and external customers. Besides, infection control follows different guidelines for them for resumption of work (two consecutive negative results). Therefore, to make the exposure Zero many interventions have been incorporated and

implemented. Initially we have found many challenges in terms of staffing crunch and staff fixed assignments. But as soon situation was found under controlled, we have regained our staffs along their and patient satisfaction.

## 2.12 To compare risk factors and outcomes of COVID-19 patient with C. auris and non-C. auris candidemia.

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**Introduction:** The ongoing coronavirus disease (COVID-19) pandemic has overwhelmed healthcare systems worldwide. Secondary Candida spp. including Candida auris bloodstream infections in COVID-19 patients with prolonged intensive care unit (ICU) stays is being documented. C. auris is a global health threat which leads to severe disease with high mortality rates.
We aimed to compare the risk factors and outcomes of COVID 19 patients with C.auris and non-C.auris candidemia.

**Methods and Results:** We included 21 COVID 19 patients, from April 4,2020 to September 23, 2020. 3 of our patients had C.auris candidemia, 17 had non-C.auris candidemia, and 1 patient's catheter tip was colonized with C.auris. We compared the host factors, clinical and laboratory parameters of these patients.
75% of the C.auris patients and 35% non-C.auris patients had central line associated blood stream infection. C.auris patients had longer duration of hospital stay. Prior broad spectrum antibiotics were given in all the patients in both groups. Raised beta D-glucan was seen in 25% C.auris patients and 35% non-C.auris patients. Antifungal theray was given in 100%C.auris and 82% non-C.auris patients. Microbiological clearance from blood was seen in 67% C.auris patients and 30% non-C.auris patients. Other laboratory parameters were comparable between both groups. 75% C.auris and 71% non C.auris patients received treatment for COVID 19. 75%C.auris and 76% non-C.auris patients received mechanical ventilation. Mortality was seen in 50% C.auris and 60%non-C. auris patients.

**Conclusion:** Our observations suggest increased risk for critically ill COVID-19 patients to develop co-infection with Candida spp., which is likely to increase mortality rates. The need for early recognition of candidemia and appropriate antifungal therapy are basic requirements to improve the outcome of COVID-19 patients in ICU.

## 2.13 Adaptation and effectiveness of Tele-clinic in Ophthalmology section during COVID 19 pandemic in a Tertiary care hospital

*Wardah Moazzam, Saniya Seher, Haroon Tayyab.*
*\*Department of Ophthalmology, Aga Khan University, Karachi, Pakistan*

The COVID-19 pandemic has compelled the healthcare system worldwide to come up with strategies to provide patient care in the safest structured manner. It became necessary to systemically introduce modalities that provides healthcare facilities far and wide yet curtails the virus transmission through patient –doctor contact. The Centers for Disease Control and Prevention in acknowledgement of the necessity of social distancing has recommended telemedicine.

Tele-clinic usage gained popularity and shows higher confidence of ophthalmologist associated with higher usage during the COVID-19 pandemic as it encompasses triage of cases and management of symptoms that could be a part of the spectrum of covid-19. Another benefit is patient satisfaction of seeing an ophthalmologist for follow up of previously diagnosed conditions such as ARMD, glaucoma or cataracts or newly onset symptoms like conjunctival hyperemia, chemosis, epiphora and increased secretions that are also reported as the ocular findings of COVID-19.

Caffery et al. reported 62 discrete tele clinic models of ophthalmology care for screening, triage, remote supervision, educational and emergency services. At Aga Khan University Hospital Tele clinics were conducted from March 2020 till September 2020.

**Background:** Telemedicine is a modality that in the peri COVID -19 period makes it fast and adequate method to consult an ophthalmologist from the comfort of home.

**Rationale:** This study aims to look into the potency of tele clinic modality in ophthalmology by evaluating the demographic of the patients who availed this opportunity, their presenting complains and the effectiveness of the consultation.

**Operational definitions:**
**Tele clinic:** Tele clinic is defined as the use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration. Technologies include video conferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communication. (6)

**Methods:**
**Study design**: Cross sectional study
**Study setting**: This study will be conducted at Department of Ophthalmology, Aga Khan University Hospital, Karachi.

**Duration:** Data collection occurred over a 40-week period from December 2020- September 2020.

**Data collection:** By Questionnaire, data will be confidential. Patient's name and data will not be declared. Data access would be provided to researcher only. Patients will be presented in numeric form. Telephonic consent will be taken. Yes or no questionnaire will be asked that will be available both in English and Urdu. Presenting complain would be addressed.

**Data Analysis:** Sample size of 105 patients calculated from open epi with 95% confidence interval. Both follow up and initial patient inclusive. Data will be presented on pie chart. T test will be applied. Data will be analyzed using SPSS version 22. (7)

**Participants:**
**Inclusion Criteria**
- All age groups
- Both genders
- Initial and follow up visit
- Immune compromised patients

**Exclusion criteria**
- Ocular trauma
- Sudden loss of vision
- Vision threatening conditions
- Ist post operative day patients

## 2.14 Complications associated with therapeutic dosing of Enoxaparin in COVID-19 patients; A SYSTEMATIC REVIEW

*Haleema Noor, Umer Ali*
*\*Department of Pharmacy, Aga Khan University, Karachi, Pakistan*

**Objective:** To analyze the complications, associated after therapeutic anticoagulation with Enoxaparin, in COVID-19 patients.

**Methodology:** It is an undergoing retrospective open label, non-randomized study among adult population admitted from August-2020 till October-2020 in COVID unit of tertiary care hospital, Karachi. Patients have been electronically assessed for therapeutic anticoagulation with enoxaparin and bleeding episode post therapy is analyzed through patient bedside folders.

**Result:** Current assessment has been performed on 75 patients. After thrice upper limit normal (ULN) of d-dimer was reported, all of the patients were anticoagulated therapeutically with full dose (1mg/kg/dose) twice daily of enoxaparin. Among the patients analyzed for bleeding incidence, 14.8% of the population observed adverse drug event in the form of intracranial, gastrointestinal or per-rectal bleed.

**Conclusion:** Results showed that enoxaparin bears potential harm in leading towards complications of bleeding. D-dimer should be re-tested on every alternate day and dosage should be tapered down accordingly. Anti-factor Xa assay could also assist as a monitoring parameter in patients bearing the risk of bleeding, after challenging anticoagulation for safe dosing adjustments.

## 2.15 Role of tocilizumab in covid-19 patients with cytokine release syndrome: a single center study from Pakistan

*Muneeba Ahsan Sayeed, Shehla Baqi, Sidra Imtiaz, Farzana Batool, \*SMBBIT/ Dow University of Health Sciences*

**Background:** COVID-19 pneumonia has emerged as a global threat which is associated with increase risk of mortality in patients suffering from cytokine release syndrome (CRS). The aim of this study was to assess the role of tocilizumab in severe COVID-19 patients having CRS.

**Methods:** A retrospective study was conducted on 106 patients; $\geq 16$ years having COVID-19 pneumonia with CRS, at the Shaheed Mohtarma Benazir Bhutto Karachi, Pakistan from April 2020-July 2020. Demographics, clinical history, management and outcome were studied.
Results: We identified 106 patients, of whom 73.6% were males. Mean age was $57.14 \pm 20.4$ years. Almost all had history of dyspnea (92.5%) followed by cough (71%) and fever (56%). Half of them had diabetes and hypertension (50%) followed by ischemic heart diseases (16%) and obesity (13%). Almost all had bilateral infiltrates (90%) on CXR. Severe COVID-19 was seen in 66% while 33% had critical disease. All patients received Tocilizumab and the mean days from hospitalization to Tocilizumab administration was 1.83 days. Inflammatory markers were compared from day 0 of tocilizumab with day 2,7,10 and 14. CRP decreased significantly after the treatment with tocilizumab and returned to normal in the majority of the patients. Overall crude mortality was 50% while 14-day mortality was 88%. Both survivors and non-survivors had similar decline in CRP, ALC and NLR while non-survivors had a higher ferritin and LDH compared to survivors (p-value 0.01 and 0.001 respectively).

**Conclusion:** Although half of the patients died but almost all patients showed improvement in inflammatory markers post Tocilizumab. Non-survivors had a high ferritin and LDH level compared to survivors which can be used as prognostic marker.

## 2.16 Awareness of personal protective equipment among Healthcare professionals

*Ainan Arshad, Muhammad Talal Ibrahim, Avinash Nankani, Russell Martins,*
*\*Department of Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** The corona virus took the world by storm starting in November 2019 with the first case being identified to march 2020, it being declared as a global pandemic by the World Health Organization (WHO). In accordance to the severity of the outcomes associated with this disease this study was aimed at mapping out the knowledge, attitude and practice of availability and use of PPE use among the health care workers and medical students.

**Method:** A cross-sectional study design was implied, using non-probability convenience sampling. Data was collected through a self-administered online questionnaire filled out by the corresponding participants in direct contact with Covvid-19 patients. SPSS Version 22 was used for data analysis. The findings were analyzed alongside guidelines from the world Health Organization (WHO).

**Results:** A total of 604 results were analyzed. Mean age of participants was $31 \pm 9.3$ years and 323 (53.5%) were males. Most data was collected from doctors (68.4%). Only 244 (40.5%) of the participants reported a history of PPE exposure. Almost all of the participants were unaware of the WHO guidelines regarding the PPE and its conservation strategy in time of crisis. Inadequate knowledge coupled with less proficiency in practice proved to be a burden on the already scarce resources of PPE. WHO recommendations regarding the use of PPE during this Pandemic have evolved alongside emerging evidence. PPE has been extensively used and the resources depleting faster than it could be replenished. There are measures being taken on a global scale to overcome this by proposing strategies to conserve the existing PPE.

**Conclusion:** PPE being an integral part for the safety of HCWs needs to be used according to the appropriate guidelines. Our research highlights a lack of awareness of PPE that needs to be addressed. The measures to ensure safety of the HCWs and to improve health care facilities is addressed in the article below.

## 2.17 Novel COVID-19 Pandemic: A Cross-Sectional Survey among Global Health Care Providers

*Amna Khan, Nazish Zafar, Kiran Abbas, Aliya Jafri, Sarmad Jamal Siddiqui, Vinita Kumari*
*\*Jinnah Sindh Medical University, Karachi, Pakistan*

**Introduction / Objectives :** Covid-19, a highly infectious disease was first reported in Wuhan, China on 31 December, 2019. It was declared pandemic by World Health Organization on 11 March, 2020 when 118,326 cases were reported globally. The present study was designed to determine the knowledge, practices, availability of personal protective equipment to health care providers and hindrance to delivering health care facilities during the COVID-19 pandemic.

**Methods:** A descriptive cross sectional study was conducted with 217 health care workers serving in different hospitals/departments across the globe. Sample size was calculated by using Open EPI software and data was analysed by using SPSS version 22.0.

**Results:** Knowledge of many 152(73.4%) participants regarding guidelines for isolation of suspected cases and recommendations for wearing mask in community setting was not satisfactory. About 51(24.63%) did not receive any personal protective equipment. Inadequate provision of personal protective equipment was reported by 78(37.7%) participants as most common factor that might impede their willingness to work during COVID-19 pandemic. About half 98(47.3%) of the participants admitted that they are not well prepared/trained in handling COVID-19 cases. PCR was correctly reported as diagnostic test for SARS CoV-2 by 136(65.7%) respondents.

**Conclusions:** Our study recorded lack of knowledge about newly emerged COVID-19 pandemic among health care workers. Shortage of ventilators, testing kits and personal protective equipment was noted in many hospitals and departments. Lack of personal protective equipment and insufficient training in infection control management may act as barriers in delivering health care during COVID-19.

## 3.0 Treatment

## 3.1 Potential herbs of anxiety and depression for quarantine people in current COIVD-19 situation

*Saara Mudasir, Hamna Rafique, Prashant Tikmani, Saida haider, Zehra Batool*
*\*Department of Biological&Biomedica, Aga Khan University, Karachi, Pakistan*

**Introduction:** Uncertainties due to the current situation of novel corona virus in all over the world is now raising towards prolonged self-isolation due to maintain social distancing. To maintain the social distancing there is some valuable changes is happening. Most of the employee doing work from their homes, computational work is increased, changes in medical facilities, OPDs done through Apps and etc. Employee are very happy to work from their home, Information technology is advanced now, other than corona virus infected patients using Apps if the condition not so much sever. The outburst of coronavirus disease 2019 (COVID-19) may be traumatic for people. Fear and anxiety against a disease can be irresistible and cause robust emotions in adults and children.

**Aims of objective:** to find out the herbs for the beneficial for anxiety and depression for quarantine people.

**Material and Methods:** We determined Almond and Walnut supplementation, Fennel Oil, Saffron and Chamomile, Walnut supplementation used in our previous studies to treat depression and anxiety. For the current scenario, we are suggesting are some of the herbs which we have tested previously. The ideology behind to lockdown is keep the social distancing which turns loss on other sides. People lost their mind sets and having lot of affairs to being stay in their homes. These herbs will protect from the pseudo-dementia, dementia, depression, anxiety and other psychological deficits.

**Results:** The evidence on animal model suggests avoiding mild to moderate mental health issues in quarantine stages due to pandemic condition in humans. These herbs can also be used in daily routine.

## 4.0 Community

### 4.1 Understanding transmission dynamics of SARS-CoV-2 in Pakistan

*Najia Ghanchi, Zahra Hasan, Kiran Iqbal, Abdul Momin Kazi, Syed Faisal Mahmood, Zeeshan Ansar, Asghar Nasir. *Section Molecular, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Background:** The trajectory of SARS-CoV-2 infections is of concern in populous, low-middle income Pakistan. We describe the observational causality of COVID-19 cases with a focus on the metropolis, Karachi.

**Methods** Retrospective cross-sectional analysis of 54,017 SARS-CoV-2 polymerase chain reaction (PCR) tests at Aga Khan University Hospital, a tertiary care facility in Karachi, Pakistan. Geospatial mapping of countrywide data was done with emphasis on Karachi and Sindh province.

**Findings** Thirty-three percent of cases tested were positive for SARS-CoV-2. From first diagnosis in late February, COVID-19 cases increased slowing, mostly associated with travelers. Infections peaked in mid-June and subsequently declined. The mean age of COVID-19 cases was $39 \pm 17$ y. Most COVID-19 cases were males aged 21-40 years, with a lower odds ratio of disease in females. However, significantly more males were tested than females across all age groups. However, within each gender there was no difference between COVID-19 positivity rates.
In Sindh, SARS-CoV-2 test positivity was predominantly associated with urban centers mainly, Karachi. The trajectory COVID-19 was in concordance with local lockdowns, transport restrictions and the implementation of universal masking. Geospatial mapping of COVID-19 cases revealed an association with a dense population with a lower socio-economic status. Increased testing but lower positive COVID-19 cases were associated with a higher income setting.

**Interpretation** Increased reporting of COVID-19 in Pakistani males was attributed to a gender bias in testing. SARS-CoV-2 transmission was associated with urban rather than rural settings where, increased testing was associated with a high income setting whilst higher positive rates with a lower income, more dense population. Reducing the gender bias in testing together with equitable testing and tracing across all socio-demographic settings would be key to avoid under surveillance of SARS-CoV-2 transmission in the population.

### 4.2 The prevalence of glucose-6-phosphate dehydrogenase (g6pd) deficiency in healthy blood donors at Karachi, Southern Pakistan.

*Sana Brohi, Bushra Moiz,*
*Section Haematology Transfusion and Medicine, Department of Pathology and Laboratory Medicine, Aga Khan University, Karachi, Pakistan*

**Objective:** To determine the ethnic-wise prevalence of Glucose 6 phosphate Dehydrogenase (G6PD) deficiency in healthy blood donors in Karachi, Pakistan.
**Methods:** We enrolled 225 healthy adult male blood donors from 1st March 2018 till 30th November 2020 at clinical laboratories AKUH Karachi. Ethnicity was based on self-classification. G6PD enzyme was evaluated by absence /delay in colour change by NADPH reduction (qualitative Trinity biotech G6PD kit) and based on time interval of colour change donors were classified either as not deficient or partial G6PD deficient and complete G6PDdeficient.

**Results:** Out of 225 adult male blood donors, 0.4% donors were complete G6PD deficient while 11.5% were partially deficient. Ethnic wise results of partially deficient donors showed that majority were Urdu speaking (14.5%) followed by Pashtun (15.3%), Baluchi (8.3%), Sindhi (6.8%), Punjabi (4.7%), and donors from minority groups were (12.2%) and 1% of Urdu speaking donor were complete G6PD deficient. Conclusion: The study showed that 12% of healthy blood donors in Karachi were G6PD-deficient.

## 5.0  Education

### 5.1    mHealth Intervention for Pneumonia and COVID-19 Infection Prevention and Control (IPC) in Rural Pakistan

*Hana Mahmood, Syed Yahya Sheraz, Hira Kiani , Rakhshanda Hameed, Brian Mckinstry, Karen Fairhust.*
*\*Section Microbiology, Maternal, Neonatal and Child Health Research Network*

**Background:** Pneumonia kills 90,000 under-five children annually in Pakistan and with the spread of COVID-19, 6,513 Pakistanis have died as of 4th October 2020 attributed to delayed care-seeking secondary to impaired illness perception on pneumonia and stigma/fear of COVID-19. With mobile network coverage of 78% in Pakistan, mobile-health (mHealth) coupled with Lady Health Workers (LHWs) acting as a bridge between the community and healthcare system can be an effective approach for COVID-19 and pneumonia infection prevention and control (IPC).

**Objective:** To develop and determine the feasibility of an mHealth based intervention package for use by LHWs on educating caregivers on under-five pneumonia and COVID-19 IPC in rural communities of Pakistan.

**Methods:** A mobile application with audio-visual content based on the guidelines of WHO and UNICEF has been developed using an open source software. Recruited LHWs will use the mobile application to deliver pneumonia and COVID-19 information in a rural community (Tarlai Kallan) in the federal capital Islamabad. Text and voice messages on the subject will be sent to the mobile phone of the caregivers counselled by LHWs. Quantitative Pre and post intervention surveys with the caregivers will be conducted to record the progress of the intervention.

**Results:** The study is still under way. Hence, the findings will be reported once complete.

**Conclusion:** mHealth has the potential to improve access to health information for effective IPC against under-five pneumonia and COVID-19 so this intervention is likely to be acceptable by the community

### 5.2    A web-based health education module and its impact on the preventive practices of health-care workers during the COVID-19 pandemic

*Kiran Abbas, Syed Muhammad A Nawaz, Nazish Jaffar, Fareena Soomro, Kanza Abid, Moiz Ahmed.*
*\*Jinnah Postgraduate Medical Centre*

**Introduction/Objectives**: Proper training on the preventive measures against COVID-19 among health-care workers is crucial for mitigating the spread of viral infection. The present study evaluated the efficacy of a brief web-based module on the practice of hand hygiene and respiratory etiquette among respective health-care workers.

**Methods and Materials:** A comparative study was conducted with a total of 500 participants between January 2020 to June 2020. A self-reported questionnaire was used for both pre- and post-intervention evaluation. The post-intervention assessment was conducted 1–2 weeks following the intervention. The difference in the practice of hand hygiene and respiratory etiquettes during work hours was recorded.

**Results and Conclusions:** We found that the intervention resulted in an evident difference in the use of alcohol-based hand sanitizer by the participating doctors before examining the patient. Interns showed a much higher propensity to wash their hands for at least 20 s, relative to other health-care workers. The difference between pre- and post-intervention handwashing for >5 times/day was 6.5% in females and 4.5% in males. In short, the study was able to demonstrate that a web-based health education module is an effective tool for the education and promotion of preventative measures in hospital setups, which may ultimately aid in halting the spread of COVID-19 among health-care workers.
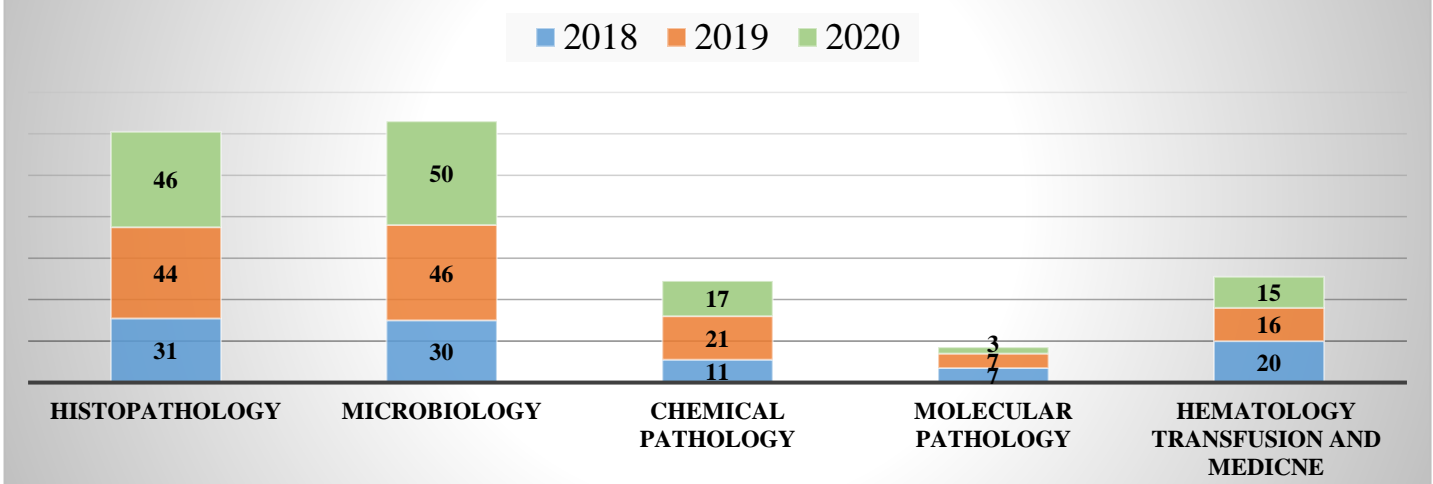
# RESEARCH REPORT

# 2018 - 2020

## DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE

**Publications in the year 2018 - 2020**

| Sections | 2018 | 2019 | 2020 |
|---|---|---|---|
| Histopathology | 31 | 44 | 46 |
| Microbiology | 30 | 46 | 50 |
| Chemical Pathology | 11 | 21 | 17 |
| Molecular Pathology | 7 | 7 | 3 |
| Haematology and Transfusion Medicine | 20 | 16 | 15 |
| Total | 99 | 134 | 131 |



Publications in the year 2018 - 2019 - 2020

## Publications in International and National Journals 2018 – 2020

| | 2018 | | 2019 | | 2020 | |
|---|---|---|---|---|---|---|
| | **National** | **International** | **National** | **International** | **National** | **International** |
| **Histopathology** | 7 | 23 | 5 | 5 | 8 | 38 |
| **Microbiology** | 4 | 26 | 4 | 42 | 6 | 44 |
| **Chemical Pathology** | 6 | 5 | 5 | 16 | 6 | 11 |
| **Molecular Pathology** | 0 | 0 | 3 | 4 | 0 | 3 |
| **Haematology and Transfusion Medicine** | 6 | 14 | 0 | 16 | 2 | 13 |
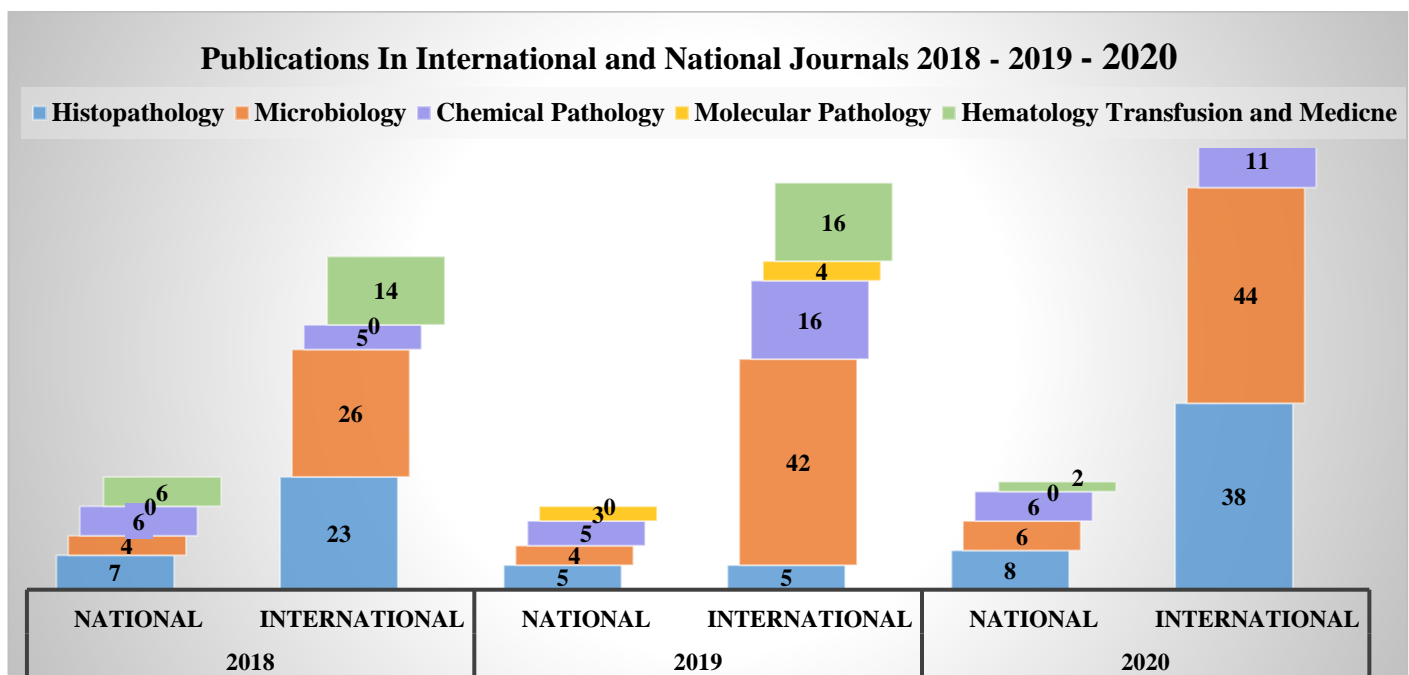
# Types of Publication 2018 – 2020

| 2018 | | | | | | |
|---|---|---|---|---|---|---|
| | Original Article | Review Article | Case report | Letter to Editor | Editorial | Book Chapter |
| Chemical Pathology | 12 | | 1 | | | |
| Haematology and Transfusion Medicine | 14 | | 7 | | 1 | |
| Histopathology | 22 | 3 | 11 | | | |
| Microbiology | 30 | 2 | 5 | | | |
| Molecular Pathology | 4 | | 1 | | | |

| 2019 | | | | | | |
|---|---|---|---|---|---|---|
| | **Original Article** | **Review Article** | **Case report** | **Letter to Editor** | **Editorial** | **Book Chapter** |
| **Chemical Pathology** | 19 | | 2 | | | |
| **Haematology and Transfusion Medicine** | 12 | 2 | 2 | | | |
| **Histopathology** | 27 | | 16 | | 1 | |
| **Microbiology** | 39 | 1 | 5 | 1 | | |
| **Molecular Pathology** | 5 | 2 | | | | |

| 2020 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Original Article** | **Review Article** | **Case report** | **Letter to Editor** | **Editorial** | **Book Chapter** | **Guidelines** |
| **Chemical Pathology** | 14 | 1 | 2 | | | | |
| **Haematology and Transfusion Medicine** | 13 | | 2 | | | | |
| **Histopathology** | 31 | 1 | 9 | | | 5 | |
| **Microbiology** | 36 | 2 | 7 | | 2 | | 3 |
| **Molecular Pathology** | 2 | | 1 | | | | |
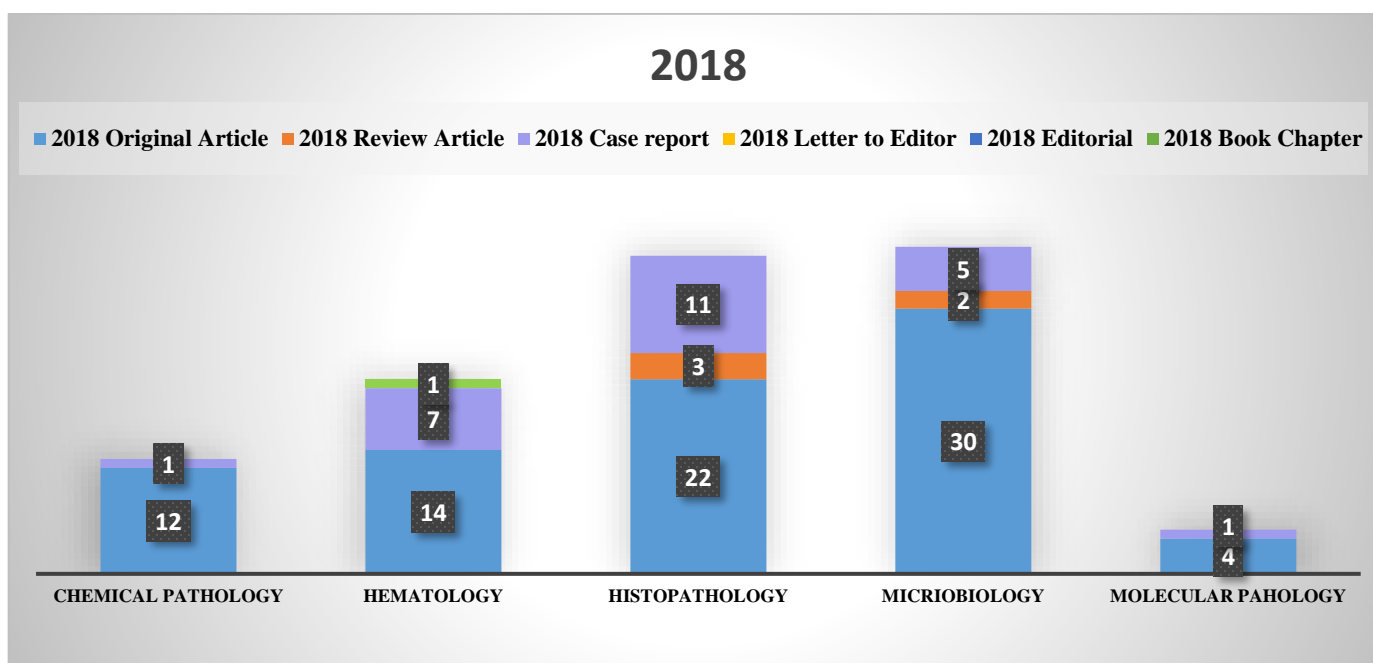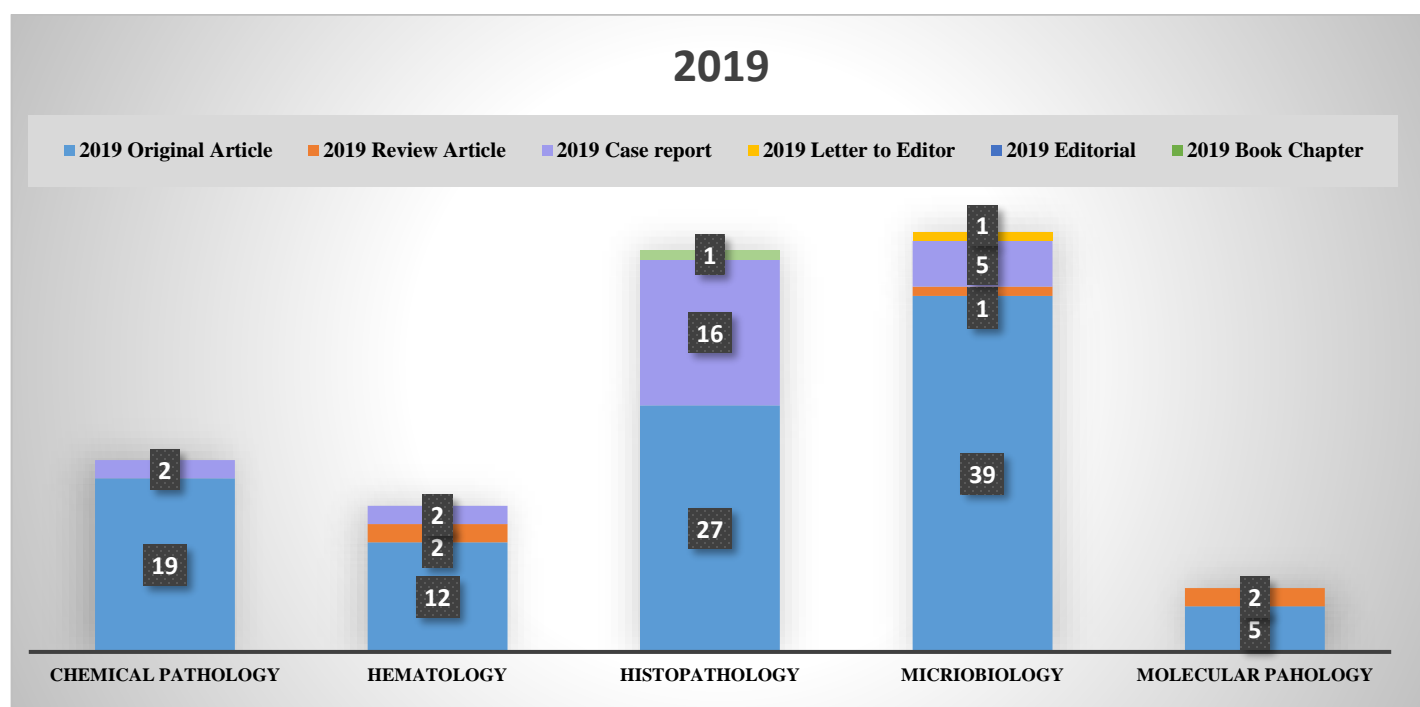
# 2020

■2020 Original Article ■2020 Review Article ■2020 Case report ■2020 Letter to Editor ■2020 Editorial ■2020 Book Chapter ■Guidelines
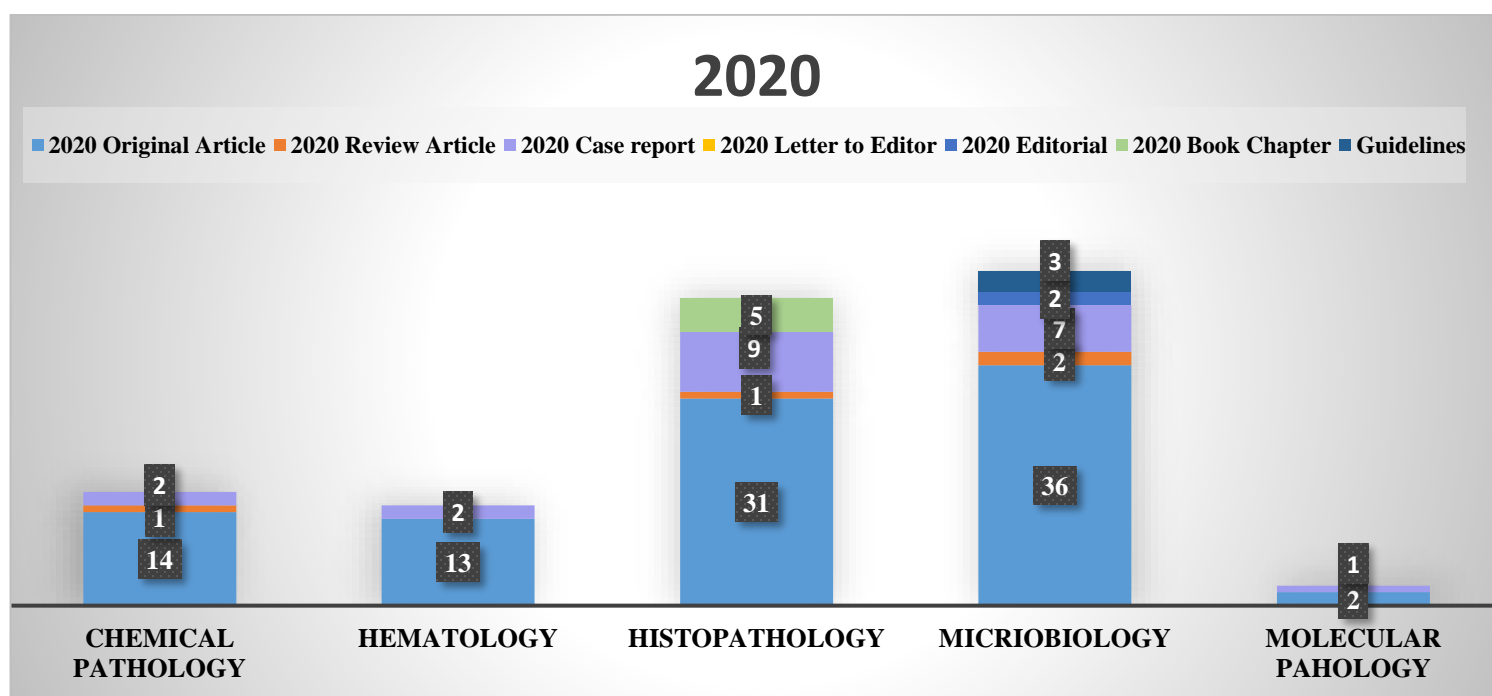
# AWARDED GRANTS   2018 – 2020

|                     | 2018 | 2019 | 2020 |
|---------------------|------|------|------|
| **Extramural grants** | 4    | 4    | 11   |
| **URC**             | 2    | 2    | 2    |
| **Seed Money**      | 1    | 0    | 0    |
| **SoTL**            | 1    | 0    | 0    |
| **RRG**             | 4    | 4    | 4    |



AWARDED GRANTS   2018 – 2020
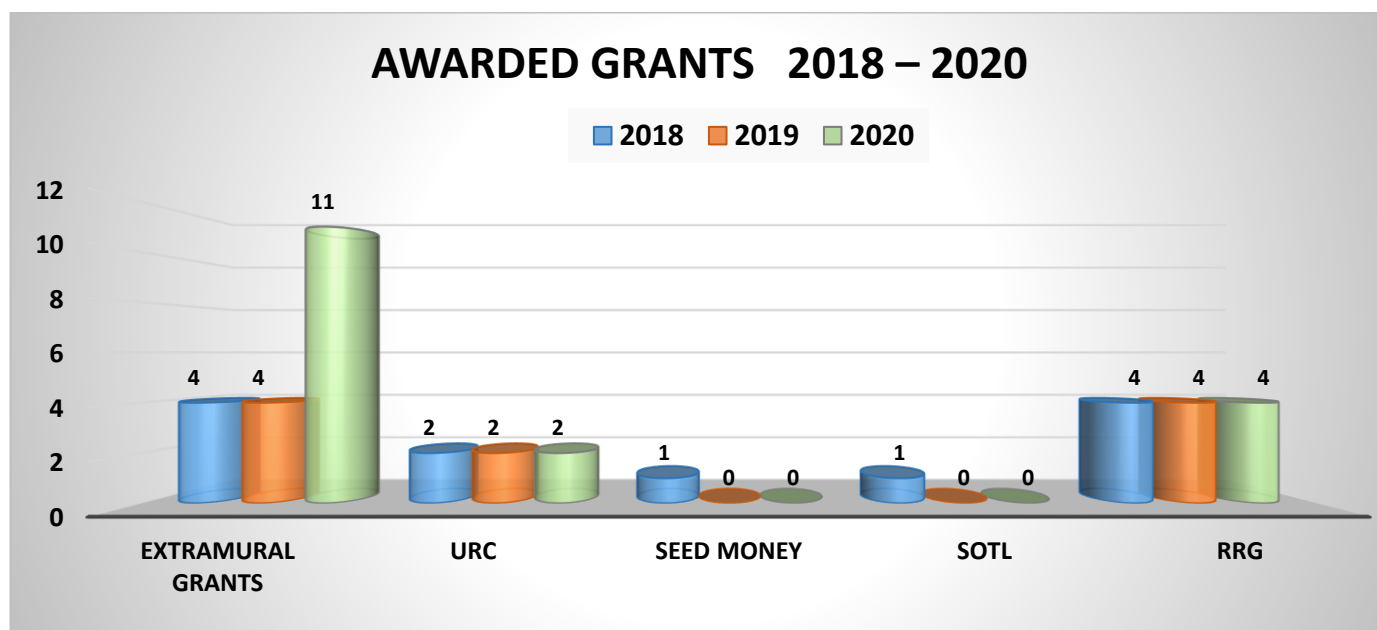
## SECTION WISE BREAK-UP OF GRANTS

### 2018

| Section | Extramural grants | URC | Seed Money | SoTL |
|---|---|---|---|---|
| Chemical Pathology | 0 | 0 | 0 | 1 |
| Hematology and Transfusion Medicine | 1 | 0 | 0 | 0 |
| Histopathology | 0 | 0 | 1 | 0 |
| Microbiology | 2 | 1 | 0 | 0 |
| Molecular Pathology | 1 | 1 | 0 | 0 |

### 2019

| Section | Extramural grants | URC | Seed Money | SoTL |
|---|---|---|---|---|
| Chemical Pathology | 0 | 0 | 0 | 0 |
| Hematology and Transfusion Medicine | 0 | 0 | 0 | 0 |
| Histopathology | 0 | 0 | 0 | 0 |
| Microbiology | 3 | 2 | 0 | 0 |
| Molecular Pathology | 1 | 0 | 0 | 0 |

### 2020

| Section | Extramural grants | URC | Seed Money | SoTL |
|---|---|---|---|---|
| Chemical Pathology | 1 | 0 | 0 | 0 |
| Hematology and Transfusion Medicine | 0 | 0 | 0 | 0 |
| Histopathology | 0 | 0 | 0 | 0 |
| Microbiology | 8 | 0 | 0 | 0 |
| Molecular Pathology | 2 | 2 | 0 | 0 |

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