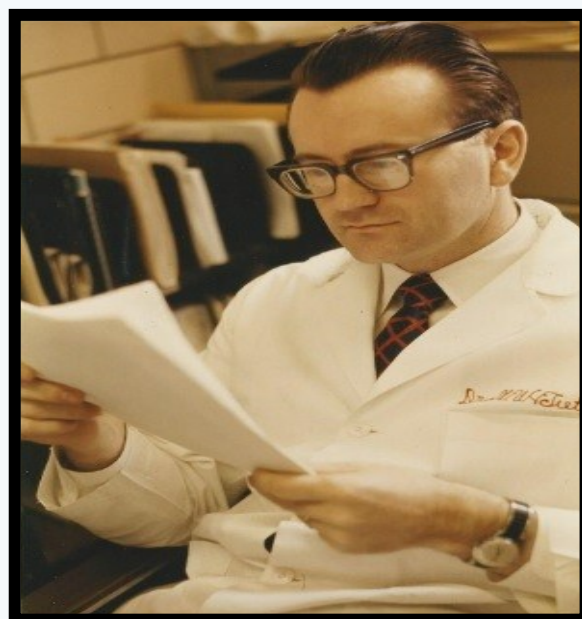


Loss of two Giants of Chemical Pathology



Lt Gen Syed Azhar Ahmed (Retd)
HI (M), SBt
(1929-2019)



Norbert W. Teitz
1926-2018



CHEMCON 2018
Quaid-e-Azam Medical College Bahawalpur
23-24 February, 2018



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From the Chief Editor's Desk



It is a great honor and privilege for me to be appointed as Chief Editor of our prestigious newsletter, **The Spectrum**. I applaud my mentor, my predecessor, Founder Chief Editor (2012–2018) **Brig (Rt) Aamir Ijaz** for his inspiring commitment, outstanding contribution, and service in elevating the newsletter to its current level of excellence. Many thanks to him for supporting me in embarking upon this new academic assignment. The new editorial team will continue to seek his expert guidance for taking The Spectrum to further heights of recognition and readership.

Alhamdulillah, I am delighted to present you the 7th volume of our newsletter. I consider myself fortunate to have great editors **Dr. Maryam Rafiq** and **Dr. Sumbal Nida** who have put in a lot of effort in bringing this newsletter to your hands. Their dedication and hard work is highly commendable. Keep up the good work girls!

Last year has been a great loss for Chemical Pathology with the sad demise of two legends, Giants of Chemical Pathology, **Lt Gen Syed Azhar Ahmed (Retd) HI (M), SBT** and **Norbert W. Teitz**. We are dedicating this issue to these two icons of Chemical Pathology.

We congratulate Brig. (Rt) Aamir Ijaz on successful publication of his book “**Chemical Pathology for Beginners**”. This astonishingly brilliant book is a proof of his passion and devotion towards his students and speciality. “Chemical Pathology for Beginners” will be a valuable asset for both trainees and consultants.

In this issue you will enjoy very interesting article “**Speak English as English Speak**” by Brig (Rt) Aamir Ijaz and a full of emotions poem “The Torn Angel” by Dr. Sumbal Nida. Updates from **Dow Medical University** and **Indus Hospital** are also included. “**Utilizing the Virtual Podium- Two ZOOM sessions for Chemical Pathologists in Pakistan**” by Dr. Sibtain Ahmed describes an excellent use of technology by Chemical Pathologists in Pakistan. A report on “**Quality Control Interpretation Programme From Pakistan**” by Dr. Shabnum is also included in this issue. Moreover, you will also find some educational articles “**Fecal Elastase: A marker for exocrine pancreatic function**” by Dr. Faryal Husnain, “**Acute Kidney Injury**” by Dr. Sabiha Waseem, “**Pre-analytical phase of analysis**” by Dr. Arfa Goheer and a case scenario by Dr. Iqra Sajid. I hope you will like our humble effort and would like to have an input from our readers, and contributors to enhance the overall quality of the newsletter. Last but not the least we wish a great success to the Department of Pathology, AFIP, Rawalpindi and organizers of ChemCon 2019.

Dr. Sara Reza

Update from Dow University of Health Sciences

Section of Chemical Pathology, Department of Pathology, Dow International Medical College, Karachi, is fully accredited for FCPS training by CPSP March 2019.

Dr. Sahar Iqbal, Associate Professor Pathology, Dow University of Health Sciences has become approved supervisor of Chemical Pathology from June 2019.

Dr. Sahar Iqbal



Message From the President

I am short of words to express my pleasure in writing a few words for the 7th Edition of The Spectrum.

As 8th President of PSCP, my task is not easy as my predecessors have set the bar so high and maintaining the standard of work is an uphill task. Since its inception in 2004-5 my teacher and mentor and founding President, Maj Gen Farooq Ahmed Khan HI(M) (Retd) groomed this Society as a very professional and academic body. Later he provided his valuable guidance as Patron of PSCP.

Here I also want to admire the untiring efforts of the last council of PSCP under the leadership of Prof Asim Mumtaz. In fact PSCP got a new life in the previous tenure in terms of renewal of PSCP registration after twelve years, as well as successful completion of the audit of society and making the bank account functioning after fulfilling numerous requirements.

I congratulate Maj Gen Syed Raza Jaffar, Brig Muhammad Aamir and their team members for organizing CHEMCON 2019 at Army Medical College Rawalpindi. This annual PSCP academic activity will be another milestone in the educational achievements of the our Society.

Lately PSCP has provided auspices for a number of CME activities in various institutes of the country, including one day seminars and workshops. In addition, short textbook of Chemical Pathology has also been published. I think this is exactly the purpose of establishing this society.

In the end I want to congratulate Dr. Sara Reza and Dr Sumbal Nida on their appointment as Chief Editor and Editor of The Spectrum, respectively. Dr. Mariam Rafiq continues as a vital member of the editorial board. I am sure the newsletter will touch new heights of glory with such a talented doctors as its editors.

Brig.(Retd.)Aamir Ijaz

Felicitations

We offer our warmest congratulations to the following members on passing their FCPS II exam. Wish you all a very bright future filled with the promise of a wonderful career.

Dr. Aaizah Maryam (National Hospital)

Dr. Saba Raza (Ziauddin)

Dr. Afshan Yasir (AFIP)

Dr. Sanam Haneef (PNS Shifa)

Dr. Azooba Fatima (AFIP)

Dr. Sara Khan (QAMC)

Dr. Faghia Shahid (QAMC)

Dr. Shehribano Imran (FMH)

Dr. Imran Ali (QAMC)

Dr. Sumbal Rani (QAMC)

Dr. Kiran Imran (SIUT)

Dr. Tabinda Yasmeen (QAMC)

Dr. Mehreen Talal (AFIP)

Dr. Tahira Jabeen (QAMC)

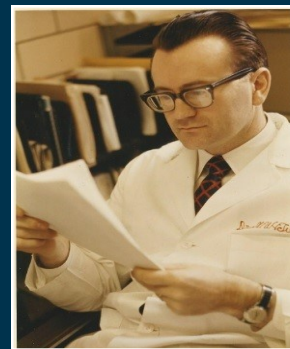
Dr. M. Zubair Yousaf (CIP)

Dr. Zubair Khan (QAMC)

Dr. Rabia Wasif (QAMC)



Loss of two Giants of Chemical Pathology



Lt Gen Syed Azhar Ahmed (Retd) HI (M), SBt

On 22nd March 2019, medical community in general and Chemical Pathology fraternity in particular lost one of the brightest stars in its history Lt Gen Syed Azhar Ahmed (Retd) HI(M), SBt. He graduated from Patna (India) in 1952.

After migration to Pakistan he joined Army Medical Corps and selected Pathology as his specialty. Later he went to UK and qualified PhD and FRCPath in Chemical Pathology. For several decades he remained the only FRCPath in Chemical Pathology in the country until this honour was conferred to Maj Gen Farooq Ahmad Khan (Rtd) in 2012. He joined Armed Forces Institute of Pathology in 1973 and during his 15 years of command, AFIP Rawalpindi became a real centre of excellence for Pathology.

He patronized and groomed several young Pathologists who later became leading professionals in their disciplines. One of his most brilliant students was Maj Gen Farooq Ahmad Khan (Rtd) who continued his mission. Almost all the Chemical Pathologists in the country got their inspirations directly or indirectly from these two great teachers.

After retirement in 1988, Gen Azhar joined Baqai University Karachi and rose to the appointment of vice chancellor.

His devotion and dedication once again resulted into a great medical institute and Baqai University gained international fame.

Recently he got retirement from this university and mashAllah he is continuing academic activities from his home in Karachi. After getting retirement from this university he went to United States to live with his wife and daughter, where he stayed till his last breath. It is very difficult to describe the personality of Gen Azhar in words; **“a scientific scholar, great mentor and patronizing teacher”** are just a few.



Norbert W Teitz

Dr. Teitz died on 23rd May 2018. He published the first edition of the *Fundamentals of Clinical Chemistry* in 1969; the 8th edition of this book has already appeared. The *Tietz Textbook of Clinical Chemistry* followed almost two decades later to become the main reference book in the Chemical Pathology. He was born in Stettin, Germany in 1926; one of seven children who all pursued a career in science. He thought PhD was a harder goal to achieve, so that is what he pursued. He immigrated to America in 1954. He married Gertrud whom he met in Munich just before he left Germany. They had four children. His first job was at Rockford Memorial Hospital in Illinois, working under the guidance of Dr. Samuel Natelson, an early pioneer in the development of clinical laboratory methods. At the time, the field of clinical chemistry was undergoing a transformational change driven by people like Otto Folin, Donald Van Slyke,

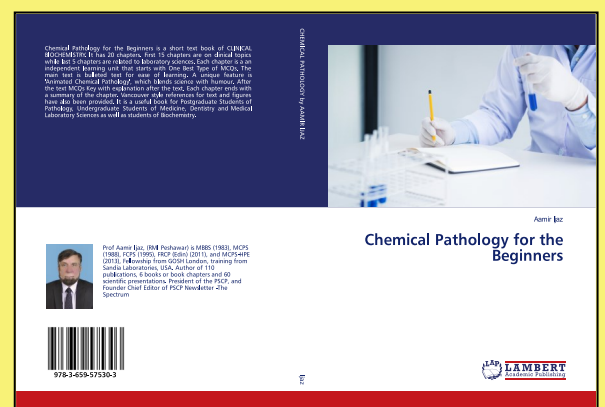
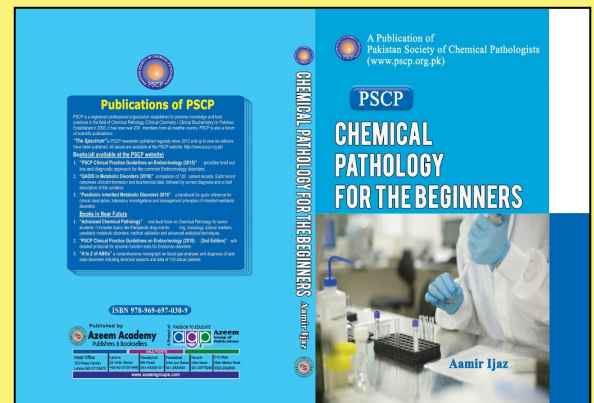
and Michael Somogyi. In the 1950's, instrumental methods of analysis such as flame photometers and UV spectrophotometers as well as systems such as the Coulter electronic cell counter and the Technicon Auto Analyzer had been introduced and changed forever the landscape of the clinical laboratory. In 1959, he was offered a position at Mount Sinai Hospital Medical Center in Chicago with a faculty appointment at the Chicago Medical School. During his interaction with clinicians, he realized their great dependence on laboratory tests and the need for having a book that bridges modern automated technology and pathophysiology to better connect the medical staff with the clinical laboratorians.

Brig Aamir Ijaz (Retd.)

New PSCP Publication

Chemical Pathology for the Beginners

A short textbook of Chemical Pathology edited by members of PSCP has been published by a local publishers (Azeem Academy, Lahore) and International Publishers (Lambert Academic Publications). In Pakistan the book is available at the publishers outlets in various cities at low cost while international edition is available through online bookstores e.g. 'My Books' and will soon be available at 'Amazon.com'.



Speak English as English Speak !!!

English is not our native language. Sometimes we speak this language in our *own way* which is not comprehensible to other people. Here are some words with local and British (not American) pronunciation:

Word	Local Pronunciation	British Pronunciation
Abdomen	ab-damen	ab-doo-mn
Acid	ee-cid	aa-cid
Adequate	ade-kuo-ate	ade-kate
All	aal	Ool
Almond	al-mond	aa-mund
Amino Acid	aminoo-acid	emeeno-acid
Bowl	ba-wal	Bol
Breakfast	break-faast	brek-fst
Chocolate	choco-late	chak-late
Comfortable	kom-fort-able	kum-f-tbl
Comment	koo-ment	kaw-ment
Cough	Cuff	Couf
Coupon	koo-pun	koo-pawn
Debt	Debit	Det
Dessert	Dai-zert	di-zert
Duodenum	due-denum	doo-de-num
Etcetera	et-sec-tra	et-cet-ra
Iron (pressing clothes)	Iron	eye-un
Nephropathy	naph-ro-pathy	Nphro -pthy
North	Na-rth	Noo-rth
Obesity	oba-sity	ob-eee-sity
Order	Arder	oor-der
Pizza	pe-zza	peet-za
Potato	poo-ta-tto	pt-aa-to
Pronunciation	pro-noun-ciation	pr-nun-c-ay-shun
Receipt	recee-pt	ri-seet
Restaurant	res-taurant	rest-rant
Say	Says	Sez
Sour	Soor	sa-wer
Steatorrhoea	stat-tourhea	stat-rea
Suit (hotel room)	Soot	Sweet
Talk	Ta-ak	to-ak
Tomato	too-ma-tto	tm-aa-to
Vegetable	vegee-table	veg-tbl
Vehicle	vehee-cal	vee-a-kl
Women	woo-men	wi-min

Brig Aamir Ijaz (Retd.)

Utilizing the Virtual Podium- Two ZOOM sessions for Chemical Pathologists in Pakistan



Dr. Sibtain Ahmed
AKU, Karachi

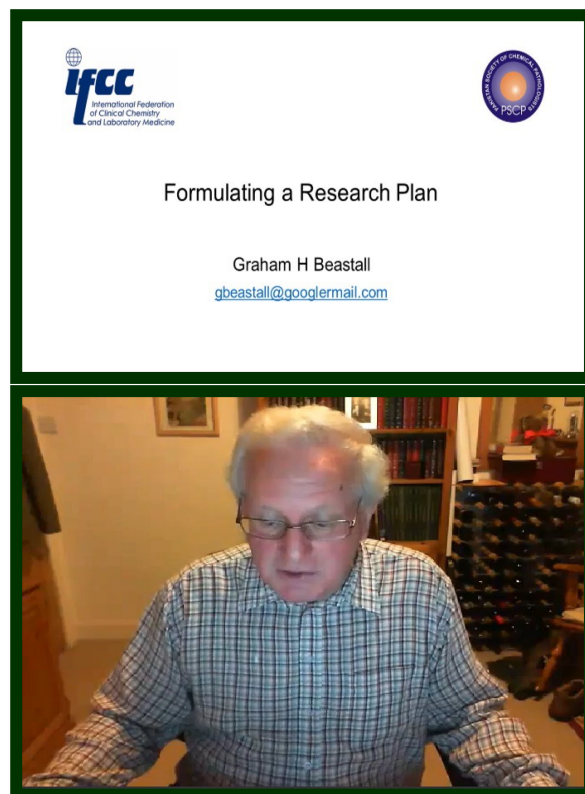
1. April 2018: Meet the fraternity – a networking session

On 26 April 2018, in line with medical laboratories professionals' week, an interactive session was organized by the section of Chemical Pathology, Department of Pathology and Laboratory Medicine, the Aga Khan University (AKU) in collaboration with the Pakistan Society of Chemical Pathology (PSCP). This was a 'first of its kind meeting' conducted using a virtual platform ensuring maximum participation from Chemical Pathology training centers across the country. Chemical Pathology group from Karachi gathered at AKU with participation from Sindh Institute of Urology and Transplant, PNS Shifa, Liaquat National Hospital, Ziauddin University Hospital, Dow University of Health Sciences and Indus Hospital. A virtual podium was utilized for the meeting, based on ZOOM, which enabled simultaneous participation from various centers across the country, specifically: SMDC Lahore, AFIP Rawalpindi, CMH Quetta, QAMC Bahawalpur, SZMC Rahim Yar Khan and RMIT Peshawar. During the two-hour session, almost all the recognized centers across Pakistan (Karachi, Rawalpindi, Lahore, Peshawar, Quetta, Bahawalpur, Rahim Yar Khan) were on board. The theme of this activity was to develop connections of Chemical Pathology trainees from across Pakistan with supervisors and discuss the expected changes in upcoming exam patterns including intermediate module (IMM) and FCPS part 2. Maximum time was spent in discussions on the overview of curriculum and assessment in IMM.



2. March 2019: Conducting Research in Laboratory Medicine- an Online Interactive Session via ZOOM with the Experts

An interactive Zoom session was organized by the section of Clinical Chemistry department of Pathology and Laboratory Medicine, The Aga Khan University (AKU) Karachi, Pakistan under the auspices of PSCP and IFCC on 13th March, 2019 from 10 am to 12 pm. The agenda of this virtual podium was to ensure collaboration between IFCC senior members and young scientists from Pakistan. The session was structured in order to share the vast experience of well renowned scientists and senior members from PSCP and IFCC alongside their overall vision related to research methodology to the budding scientists and Chemical Pathologists in the region at various levels of their profession and career. Participants from Karachi assembled at AKU whereas more than 70 participants, from 25 different centers across 14 cities in Pakistan were connected through ZOOM. The session was facilitated by Chemical Pathology faculty from AKU alongside two international speakers Dr. Graham Beastall (Former President IFCC) and Dr. Ashlin Rampul (Core member IFCC task force for young scientists).



Participants Connected via zoom



Participants from Bahawalpur



Participants from Karachi gathered at AKU



Participants from Lahore

Updates from The Indus Hospital

Inauguration of Total Laboratory Automation:

The Chemical Pathology Section at The Indus Hospital installed Total Laboratory Automation (TLA) last year. The inaugural ceremony was held on 24th December 2018. The high tech system is placed by Abbott Diagnostics, and has the newly launched Alinity ci series. The TLA system is accompanied by AlinIQ, a software system for smart management with AMS (Analyzer Management System), IMS (Inventory Management System) and BIS (Business Intelligence System). Indus is one of the first sites globally to install the unique combination of Alinity ci series, A3600 track and AlinIQ Informatics solution. The integrated clinical chemistry and immunoassay systems, along with the pre and post analytics, has helped in developing a lean system with increased efficiency and reduced turnaround time.

Accreditation of Residency Program:

Chemical Pathology Section of The Indus Hospital gained full accreditation for FCPS II residency training by CPSP. The Pathology residency training program at The Indus Hospital is of five years. The trainees are eligible to appear for Part II examinations at the end of four years, with an additional year in hand to further refine and enhance their learning

CME:

A symposium was held on “An Overview of Laboratory Accreditation- ISO 15189 and CAP Guidelines on 2nd May 2019. It was well attended by leading Chemical Pathologists of the city as well as Haematologists, Microbiologists and Histopathologists, in addition to laboratory managers, technologists and Quality Assurance staff. Dr. Usman Ali from Ziauddin Medical University, Dr. Sahar Iqbal from Dow University of Health Sciences and Dr. Lena Jafri from Aga Khan University Hospital spoke on the various aspects of ISO 15189 and CAP accreditation requirements and their inspection. This was followed by an extensive Q and A session with active participation from the audience.

ICON 2020:

The Indus Hospital will be holding its Fifth Biennial Conference on 18th and 19th January 2020. The theme of this year's conference is “Building Bridges for Better Health Care”. There will be multiple pre conference workshops as well as plenary sessions and symposia on variety of clinical and allied topics. All sections of the Pathology Department will be conducting exciting sessions on relevant topics. Last date for abstract submission is **30th October 2019**. The final scientific program will be shared soon with PSCP members.

Stay tuned for more news from ICON 2020 by The Indus Hospital!

Dr. Fatima Zehra Kanani
The Indus Hospital



THE TORN ANGEL

I hear her cry
 Cry for help with her lips so dry
 I hear her screams
 Day and night in every dream
 I feel her pain
 Pain of torture but in vain
 An angel who was torn
 Ruthlessly dragging her through the thorn
 I pray for her sweet soul
 Her eyes as green as of a doll
 She asks me if things will change
 I look at her with gaze so strange
 I try to fix the car
 Car that takes us far
 Far away into the land of flowers
 There to play and take a blessed shower
 I hold her hand and vow
 Vow to make a difference and blow
 Blow the trumpet of justice and equality
 To build a place full of tranquility
 To build a home and save them all
 And to keep them in a silent mall
 Mall full of bounties and love
 Love as beautiful as a delicate dove

Squadron Leader
 Sumbal Nida



REPORT

QUALITY CONTROL INTERPRETATION PROGRAMME FROM PAKISTAN



Clinical Laboratory is incomplete without Quality Control. QC helps in detecting analytical errors within the laboratory to ensure the reliability of test results to achieve the best patient care. Section of Chemical Pathology at National institute of blood disorders and bone marrow transplantation (NIBD) hospital, Karachi, Pakistan conducted a workshop on **“Quality Control Interpretation”** on **17th July 2019** from 8:30am–2:30pm in Amna Feroz Auditorium NIBD Hospital with collaboration of Pakistan Society of Chemical Pathologist (PSCP) under the auspices of International federation of clinical chemistry and laboratory medicine (IFCC). The workshop focused on the understanding of ABC of quality control (IQC), QC Statistics, External quality control (RIQAS Interpretation) and Method Validation.



NIBD Workshop Organizer Team

Three Guest Speakers came to NIBD Hospital upon invitation. The workshop started with recitation of Holy Quran followed by welcome address by Dr. Tahir Shamsi, Professor of Hematology and Transplant physician, Director of Stem cell research & regenerative medicine. Guests delivered interactive lectures. Dr. Lena Jafri Assistant Professor at AKUH, Karachi gave a talk on LJ Charts and its Interpretation. Brig. Aamir Ijaz (Retd), Professor Chemical Pathology, Rehman Medical Institute, Peshawar gave a talk on Method Validation. Dr. Hafsa Majid, Senior Instructor Chemical Pathology at AKUH facilitated a group activity and hands-on calculation of Standard deviation, Coefficient of variation, critical limit, mean, median and mode with their interpretation and application in a laboratory on daily basis. Dr. Arshi Naz, Assistant Professor at NIBD Hospital gave a talk on Quality Control in Coagulation laboratory.



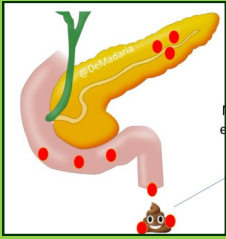
Guest Speakers receiving token from Dr. Tahir Shamsi

Dr. Samra Waheed Hematologist at NIBD gave a talk on Quality Control in the blood bank. Dr. Shabnam Dildar Ali, Consultant Chemical Pathology at NIBD Hospital Karachi took interactive session on External Quality Assurance (RIQAS) interpretation and its Importance. Dr. Saba Faraz NIBD Assistant Professor at NIBD Hospital gave a talk on Quality Control in Genetic Laboratory. The workshop was attended by participants from more than seven institutes and laboratories of Karachi. Participants included residents, technologists, quality managers, and pathologists from different subspecialties of Pathology. Lastly Vote of thanks, certificates and shields were distributed by Dr. Tahir Shamsi to the speakers and participants.



Organizers & Participants

Shabnam Dildar
NIBD Hospital, Karachi



FECAL ELASTASE

A Marker for Exocrine Pancreatic Function

Exocrine pancreatic insufficiency (EPI) is a condition caused by reduced or inappropriate secretion of pancreatic enzymes. EPI can result in clinical and biochemical manifestations causing reduced quality of life and in severe cases, even life-threatening complications. The pancreatic causes of EPI includes, Cystic Fibrosis (the most common cause), acute pancreatitis, tumours involving the pancreas, resective pancreatic surgery and Schwachman-Diamond Syndrome. While extra-pancreatic causes include, Diabetes Mellitus, Inflammatory bowel disease, gastric surgery, aging, chronic and critical illness, infections like HIV and tobacco exposure.

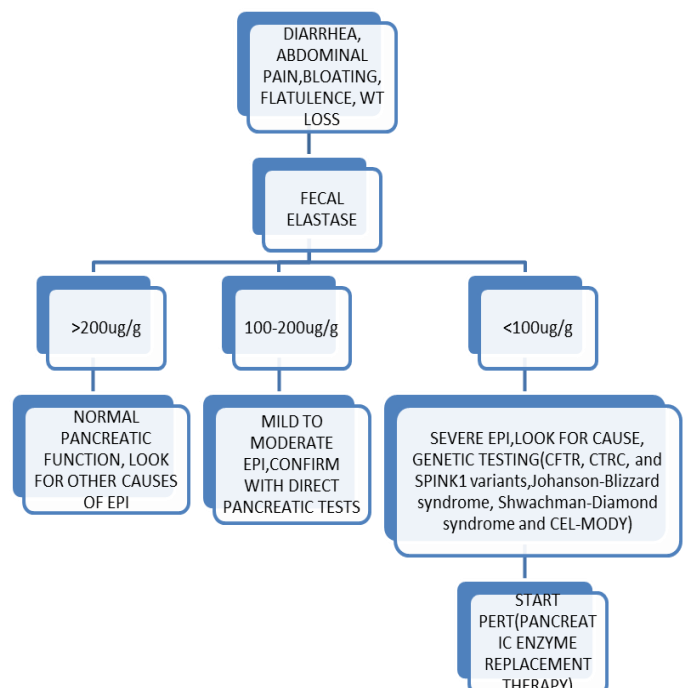
There are various laboratory tests available to diagnose pancreatic insufficiency, called Pancreatic Function Tests including fecal fat testing, fecal elastase and pancreatic function test. The pancreatic function test is considered the most sensitive test for diagnosing EPI. It is an invasive procedure, involving a tube insertion into small intestine to collect pancreatic secretions and Cholecystikinin and secretin are measured in it. This test however is cumbersome, invasive, time-consuming, costly and also cannot detect response to pancreatic enzyme replacement therapy. The fecal fat testing measures the total fat in stool sample collected over a three day period. This test is also inconvenient for most of the patients because of three day stool collection and has low specificity to diagnose EPI. That is why fecal elastase is considered the test of choice. At the Aga Khan Clinical Laboratory we have recently started fecal elastase testing.

Pancreatic fecal elastase-1:

Fecal Elastase 1 is a proteolytic enzyme produced by pancreatic acinar cells, which binds to bile salts and passes through the gut with slight degradation, the concentration of this enzyme in the feces is five times higher than that in the pancreatic juice. Therefore, it reflects the level of pancreatic output and

correlates also with the output of other pancreatic enzymes such as lipase, amylase, and trypsin. It has five isoforms (CELA1, CELA2A, CELA2B, CELA3A, and CELA3B) of these proteins, the biological specificity of which is largely unknown. The available commercial assay is an ELISA quantifying CELA2 and/or CELA3 isoforms of the human "chymotrypsin-like elastase".

Elastase-1 is highly stable in feces for up to 1 week at room temperature, and for 1 month when stored at 4°C, thus making conservation simpler. The only caution is that the measurement must be performed on solid stools; liquid stool indeed can be associated with false-positive result. Interpretation of fecal elastase-1 test is shown in figure 1. The sensitivity of FE-1 for mild, moderate, and severe EPI patients is 63%, 100%, and 100%, respectively and the specificity for EPI is 93% hence it is a useful tool for diagnosing EPI.



Dr. Faryal Husnain
AKUH, Karachi

Acute Kidney Injury

Acute kidney injury : defined as sudden deterioration of renal function or a rapid decline in glomerular filtration rate.

CONVENTIONAL BIOMARKERS OF AKI

- Serum creatinine & GFR
- Urea
- Fractional excretion of sodium
- Proteinuria

The Problem with Conventional

Biomarkers: low sensitivity & specificity to detect kidney disorders. Creatinine concentrations vary widely according to gender, age, muscle mass, muscle metabolism, body weight, nutritional status & hydration status. It is also a delayed Marker: >50% loss of renal function causes increase in creatinine. The rate of **urea** production is not constant & increases with a diet rich in protein & tissue injury (hemorrhage, trauma, treatments with glucocorticoids). On the other hand, a low-protein diet &/or advanced liver disease may reduce urea without changing the GFR. **In the AKI, the fractional excretion of sodium is the most accurate screening test to differentiate between a prerenal & an intrarenal origin. A value below 1% suggests prerenal disease.**

NEW BIOMARKERS OF AKI More than 20 AKI biomarkers have been studied and are extremely valuable. NGAL is most commonly used. NGAL & L-FABP are the earliest ones, & KIM-1 and IL-18 are detected later on, with better specificity. List of most studied emerging biomarkers include:

Neutrophil Gelatinase-Associated Lipocalin (NGAL) has prognostic value in

clinical outcomes: such as the need for dialysis & mortality. Large extrarenal production in response to systemic stress can increase its urinary excretion in the absence of AKI, also can increase in CKD, in patients with malignancies, systemic bacterial infections & UTI which may limit its use.

Kidney Injury Molecule-1 (KIM-1) can be detected in the urine of patients with acute tubular necrosis (ATN) and can serve as a biomarker in kidney **proximal tubular damage**. KIM-1 is found in all three segments of the proximal tubules in ischemic and toxic AKI.

Interleukin-18 (IL-18) is a proinflammatory cytokine that is constitutively expressed in **distal convoluted tubule and collecting tubule** in the healthy human kidney. It has high sensitivity & specificity for diagnosis of acute tubular necrosis, but its levels increase in inflammatory arthritis, IBD, SLE, psoriasis, hepatitis & MS. It has pro-inflammatory properties & its high levels in inflammatory diseases.

Cystatin C It is synthesized by all nucleated cells in the body. Its blood levels are not significantly affected by age, gender, race, or muscle mass in general, however, cystatin C, more of a GFR marker, can be useful in early AKI.

N-Acetyl-β-Glucose-Amidase Use of NAG enzyme remains limited because its urinary excretion is also high in diabetic nephropathy, hyperthyroidism & rheumatic diseases.

Dr.Sabiha Waseem
Karachi

Biomarker	Kinetics
KIM-1	Detected within 12-24h post injury, peaks at 48-72h
IL-18	Detected within 6h post injury, peaks at 12-18h
TIMP-2 + IGFBP-7	Detected within 12h post injury
NGAL	Detected within 3h post injury, peaks at 6h
L-FABP	Detected within 1h post injury, peaks within 6h

Pre-Analytical Phase of Analysis

Diagnosis of a disease largely depends on laboratory investigation results, which sometimes are unexpectedly different from patient's clinical condition. Such type of discrepancies arise due to pre-analytical, analytical and post-analytical factors. In this article we will focus on just pre-analytical one.

Physiological variations, such as age, sex, altitude, menstruation and pregnancy etc, have a profound effect on chemistry results. Other than these, sample collection, transport and processing need particular attention. While accounting sample collection, timing is crucial as fasting is required for some as triglycerides and fasting blood glucose. Diurnal variation effect the hormone levels. Posture poses a profound effect on blood chemistry. Prolonged standing as in OPD setting causes albumin and albumin bound hormone level to raise. Also causing spurious rise in renin, aldosterone and catecholamine level. Sitting posture for at least 20 min before sampling should be practiced.

Tourniquet application for more than 1-3 minutes results in hemoconcentration, raised lactate and low pH due to anaerobic glycolysis. This acidic environment causes false rise in free hormone concentration. Repeated clenching before sampling which is a common practice cause false rise in serum potassium level (1-2mEq/L) as it is released from contracting muscles. Also blood sample should

not be taken proximal to any infusion site which will definitely change the concentration of measured electrolytes.

Proper blood collection vials should be used as a type of additive is specific for each analyte. Also under filling and over filling of tube should be avoided as anticoagulant to blood ratio is disturbed and give false hematological results. For example, under filling causes falsely raised aPPT and over filling causes failure of anticoagulation. After collection recommended number of inversions should be made but shaking of tube should be avoided as it causes hemolysis which causes increased potassium, LDH, inorganic phosphorus etc.

After collection, prompt transport under ideal conditions of temperature should be made. Delay in transport or keeping the samples in refrigerator for more than 1-2 hours may cause spurious rise in potassium and inorganic phosphorus and decrease in sodium. In lab, separation through proper centrifugation should be made in time to avoid variations.

As quality controls for analytical procedures has been well established and practiced, protocol should be designed and made into practice for pre analytical one as well.

Dr. Arfa Goheer
QAMC, Bahwalpur

Case Scenario

NGAL

Case scenario:

A 25 yrs. old woman delivered a baby via caesarean section and went into postpartum haemorrhage. She was managed by doctors but still there was loss of 1.5 litres of blood. In next few hours doctor noticed oliguria and suspected acute kidney injury.

Case discussion:

Hypovolemic shock, cardiogenic shock, septic shock and major surgeries with massive blood loss are main causes of acute kidney injury (AKI). AKI if not picked up timely progresses to chronic kidney disease and ultimately end stage renal disease.

Neutrophils gelatinase associated lipocalcin (NGAL) is a protein encoded by LC-2 gene. It is Expressed in neutrophils and in small amount in kidneys, prostate and epithelium of respiratory and alimentary tract. In AKI it is secreted in large amounts in blood and urine within 2 hours of injury. It is a sensitive marker of kidney injury as compared to creatinine which is a marker of kidney function and creatinine level rises when GFR falls to less than 60ml/kg. Individuals positive for NGAL have high incidence of Renal replacement therapy and high mortality rate both in presence or absence of increased creatinine.

Hence, NGAL in critically ill patients may improve early detection of AKI and facilitates early treatment and improve overall prognosis

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CLIA Field In The World



CLIA Test Menu



Countries



Units Globally



MAGLUMI X8

Integrated System



Biolumi 8000

Chemiluminescence Immunoassay



MAGLUMI 600



MAGLUMI 800



MAGLUMI 2000



MAGLUMI 2000 Plus

Automated Biochemistry



Biossays 240



Biossays 240 Plus



Biossays BC1200



Biossays BC2200

MAGLUMI Test Menu

Tumor Markers

Ferritin
AFP
CEA
Total PSA
f-PSA
CA 125
CA 15-3
CA 19-9
HCG/β-HCG
Tg (Thyroglobulin)
PAP
CA 50
CYFRA 21-1
CA 242
CA 72-4
NSE
S-100
SCCA
TPA-snibe
Pepsinogen I
Pepsinogen II
Gastrin-17
H.pylori IgG
H.pylori IgA
H.pylori IgM
β2-MG
Calcitonin
Proinsulin
ProGRP
HE4
HER-2
*PIVKA-II

Cardiac

CK-MB
Troponin I
Myoglobin
hs-cTnI
H-FABP
NT-proBNP
BNP
Aldosterone
Angiotensin I
Angiotensin II
Direct Renin
D-Dimer
Lp-PLA2
hs-CRP
*MPO

TORCH

Toxo IgG
Toxo IgM
Rubella IgG
Rubella IgM
CMV IgG
CMV IgM
HSV-1/2 IgG
HSV-1/2 IgM
HSV-2 IgG
*HSV-2 IgM
*HSV-1 IgG
*HSV-1 IgM

Immunoglobulin

IgM
IgA
IgE
IgG

Kidney Function

β₂-MG
Albumin
*NGAL

Fertility

FSH
LH
HCG/β-HCG
PRL
Estradiol
Testosterone
free Testosterone
DHEA-S
Progesterone
free Estradiol
17-OH Progesterone
AMH
SHBG
Androstenedione
*PIGF
*sFlt-1

Hepatic Fibrosis

HA
PIIIP N-P
C IV
Laminin
Cholyglycine

Anemia

Vitamin B12
Ferritin
Folate (FA)
*RBC Folate

Inflammation Monitoring

hs-CRP
PCT (Procalcitonin)
IL-6
*SAA (Serum Amyloid A)

Autoimmune

TGA (Anti-Tg)
Anti-TPO
TRAb
ENA Screen
ICA
IAA (Anti Insulin)
GAD 65
Anti-IA2
Anti-dsDNA IgG
ANA Screen
ENA Screen
Anti-Sm IgG
Anti-Rib-P IgG
Anti-Scl-70 IgG
Anti-Centromeres IgG
Anti-Jo-1 IgG
Anti-M2-3E IgG
Anti-Histones IgG
Anti-nRNP/Sm IgG
Anti-SS-B IgG
Anti-SS-A IgG
Anti-CCP
*Anti-Cardiolipin IgG
*Anti-Cardiolipin IgM
*Anti-MPO

EBV

EBV EA IgG
EBV EA IgA
EBV VCA IgG
EBV VCA IgM
EBV VCA IgA
EBV NA IgG
EBV NA IgA

Thyroid

TSH (3rd Generation)
T4
T3
FT4
FT3
Tg (Thyroglobulin)
TGA (Anti-Tg)
Intact PTH
Anti-TPO
TRAb
TMA
Rev T3
*T-Uptake

Glyco Metabolism

C-Peptide
Insulin
ICA
IAA (Anti Insulin)
Proinsulin
GAD 65
Anti-IA2

Prenatal Screening

AFP (Prenatal Screening)
Free β-HCG
PAPP-A
HCG/β-HCG
free Estradiol

Drug Monitoring

Digoxin
CSA (Cyclosporine A)
FK 506 (Tacrolimus)

Infectious Disease

HBsAg
Anti-HBs
HBeAg
Anti-HBe
Anti-HBc
Anti-HCV
Syphilis
Anti-HAV
HAV IgM
HIV Ab/Ag Combi
Chagas
HTLV I+II
H.pylori IgG
H.pylori IgA
H.pylori IgM
*Anti-HBc IgM

Bone Metabolism

Calcitonin
Osteocalcin
25-OH Vitamin D
Intact PTH
*β-CrossLaps (β-CTX)
*total P1NP

Others

Cortisol
GH (hGH)
IGF-I
ACTH
IGFBP-3

*Available Soon

