# Pakistan Society of Haematology



President's Column

Goodbye to year 2009, and Happy New Year to all the PSH members. May Allah Almighty shower his blessings on all of us and our dear country during this year and for all times to come!

During the last quarter, two important events took place. First, NIBD annual conference, held in collaboration was a grand success. I congratulate Dr Tahir Shamsi and his team for their dedication and tireless efforts in making this conference a success. Second, PAP conference was held at PIMS Islamabad in an air of uncertainties. I take this opportunity to felicitate the organizers of the conference and the PAP higher ups for their commitment and perseverance. The conference was indeed a grand event! Hematology sessions, as other disciplines, were very well-attended.

The 12" PSH annual conference to be held at Lahore is now fast approaching. Dr Nisar Ahmed and other colleagues at Lahore are putting in all their efforts in organizing this event. I request all of you to assist them in whatever ways you can.

It is matter of great pleasure for me to give you an update on publication of PSH (Annual) Review Book. In response to my request, review articles have started pouring in. If every thing goes smooth, this book

may be published at the occasion of 12" PSH annual conference. It may be a modest start, but I hope it will lay a foundation for a "Regular Education Book" from the floor of PSH.

In the executive council meeting held during PAP conference at Islamabad, a decision was made to hold workshops on hematological morphology for the benefit of younger colleague, especially pathologists at district hospital level. Unfortunately, we had to postpone these workshops for security reasons.

I am glad that various PSH local chapters are now holding their meetings regularly. I request once again to help PSH raining its membership, especially by registering our younger colleagues.

Looking forward to see you all during the annual PSH conference at Lahore.

With the deepest regards,

Professor Khalid Hassan

### **Academics**

Dr. Nadir Ali

Consultant Hematologist,

### Hemostatis in Hemostatic Failure

Armed Forces Institute of Pathology, Rawalpindi

Introduction: Hemostasis in haemostatic failures is one of the major clinical challenges that demand a well coordinated team work between treating clinician and hematologist. Better the understanding of limitations, capabilities, and availability of facility better will be the output. Haemostatic failures may generally be encountered in any bleed due to any cause that can lead to massive hemorrhage. Most common causes are massive trauma, obstetrical accidents, clotting factor deficiency, presence of an inhibitor or thrombocytopenia. Most of these conditions are manageable at some stage, but gradually all measures appear failing if the stimulus is constant, replacement therapy is inadequate, or being replaced by irrelevant component. If expected events are ignored e.g., presence of hypothermia, acidosis, inhibitors, and undiagnosed coagulation factor deficiency or septicemia the management becomes difficult. It is rewarding if a guideline is formulated consulting hematologist, surgeon, gynecologist, and physician. Detailed guidelines by various authorities in subject are available, which must be consulted before formulating own guidelines. A summary of conditions leading to hemostatic failure and remedies is submitted below:

Massive trauma: In massive trauma major blood loss is expected that has to be replaced by whole blood. At times blood loss is rapid, complicated by shock, and presence of disseminated intravascular coagulation (DIC), achieving hemostasis becomes difficult. Lack of coagulation factors, thrombocytopenia, platelet dysfunction, presence of colloids, hypothermia, and presence of acidosis must be

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considered and treated. Cardiac events like ventricular extrasystoles, fibrillations, arrest due to low calcium, high potassium, hypothermia, excess citrate must be kept in mind and a physician may be involved. Use blood warmer, and calcium gluconate 2 ml of 10% solution/unit of blood if calcium is monitored are usually helpful. Acidosis may be serious in case of renal or hepatic disease. Sodium bicarbonate after determining base deficit may be administered. Due to presence of citrate metabolism to bicarbonate, acidosis is usually prevented. Lack of factor V, VIII, and platelets if stored blood is transfused must be balanced. FFP 1-2 units after every 10 units of blood, platelet transfusion if platelet count falls below 30x10°/L also merits consideration.

### Obstetric accidents:

Fetal loss due to incomplete or septic abortion, ruptured ectopic pregnancy, and ruptured uterus are conditions prone to develop major hemorrhage and eventually haemostatic failure if not anticipated. Post partum hemorrhage due to uterine atony, retained placenta, trauma, clotting defects, placenta accreta, acute uterine inversion, puerperal sepsis, tissue damage following obstructed labor and development of full blown DIC when ever encountered are also generally associated with hemostatic failures. Whatever the etiological factor is, the most important step is to resuscitate the patient. Administer high concentration of oxygen, tilt head down, raise legs, establish IV access with large bore cannulas, infuse crystalloid or colloid fluids, inform blood bank about emergency, transfuse uncross matched group specific blood or in case if life is seriously endangered transfuse O -ve blood, use pressure infusion & blood warming device, and alert haematologist. Monitor/Investigate the patient send sample to blood bank for matching, order full blood counts, and coagulation profile. Monitor respiratory rate, conscious level, capillary refill time and central venous pressure. Stop bleeding, identify the cause, and examine cervix & vagina for lacerations. If uterus is hypotonic or atonic ensure bladder is empty, and Give IV Oxytocin 20 units, and IV ergometrine 0.5 mg. In case of failure give oxytocin infusion (40 units in 500 ml), 'rub up' fundus to stimulate contraction or compress uterus bi-manually. If bleeding continues, give deep intramuscular or intramyometrial prostaglandin (e.g. Carboprost 250 mg in 10 ml saline) directly in to the uterus. Exclude possibility of hypothermia, acidosis, and hypocalcemia. Consider administration of recombinant factor VIIa if above measures fail. Consider surgery including hysterectomy earlier than late. In case of replacement of one or more blood volumes in 24 hours measures to prevent dilutional thrombocytopenia, dilutional coagulopathy, acid base imbalance, citrate toxicity, and potassium overload must be taken.

### DIC:

Suspect DIC in all cases of hemoststic failures associated with massive trauma and obstetric accidents. Inspect nature of oozing, color of blood and whole blood clotting time in tube. Send blood for platelet count, prothrombin time, activated partial thromboplastin time (PT & APTT), thrombin time (TT), fibrinogen levels and fibrinogen degradation products (FDPs). Increased PT, APTT, TT, and FDPs, decreased platelet count (50x10"/L) and fibrinogens (<1 g/L) are generally suggestive of DIC. Treat the cause, deliver fetus and placenta, evacuate uterus, as indicated for retained or necrotic tissue. In case of massive trauma wound debridement, removal of foreign bodies, and sealing of major bleeding points is necessary. Initially DIC can be prevented if blood volume is promptly restored with balanced salt solution like Hartmann solution or Ringer's lactate. In case of massive blood loss transfuse the freshest available whole blood or red cell concentrate. Avoid use of cryoprecipitate and platelet concentrates unless bleeding is uncontrollable. If bleeding is not controllable and coagulation tests show abnormal results give cryoprecipitate at least 15 units. If cryoprecipitate is not available give fresh plasma (15 mg/kg). In case of thrombocytopenia give platelet concentrate 5-6 units. If blood components are not available give fresh whole blood, ideally blood donated within 36 hours. Give broad spectrum antibiotics to cover aerobes and anaerobes.

### Factor deficiency and presence of inhibitors:

Factor deficiency or presence of inhibitors must be brought in consideration in case of massive bleeding poorly responding to haemostatic measures. It is possible that a minor bleeding tendency which has never been investigated manifests as severe bleeding in case of massive trauma, surgery or in obstetric situation. Mild hemophilia, or VW disease should be suspected first. If the patient is a known case of hemophilia or VW Disease and receiving factor replacement, presence of factor inhibitor may be suspected. In case of factor deficiency factor replacement usually works. In case of presence of inhibitors, change in brand, mega doses of deficient factor, prothrombin complex concentrates, FEIBA, or rFVIIa may be considered.

### Thrombocytopenia and platelet dysfunctions:

In case of thrombocytopenia associated with ITP, it is difficult to achieve hemostasis by mere platelet transfusion since platelets are removed by spleen rapidly. In case of failure intravenous high dose immunoglobulis may be considered. In case of microangiopathy.

## **Academics**

DIC, and hemorrhagic fevers platelet count may be deceptive. Platelets are partially degranulated, circulating platelets may be dysfunctional. However platelet transfusion may be kept reserve unless patient actually bleeds.

#### Conclusion

Formulate hemorrhage guidelines in your facility. Familiarize staff with protocol by rehearsals. A clear communication between blood transfusion services and treating team is the backbone of management. Ensure effective hematology support, reliable availability at blood bank of un-cross matched, and group specific blood within 10-15 min is ideally desired. A standard protocol between the hematologist and clinician over the availability of platelets, FFP, and cryoprecipitate must be adhered. Rapidly available coagulation monitoring results to facilitate the adequacy of coagulation support and guide for selection of components is another important tier.

### Further reading

- Dacie and Lewis (eds) Practical Hematology 9" ed. London: Churchill Livingstone 2002
- DBL McClelland (editor). Handbook of Transfusion Medicine. United Kingdom Blood Services. 4th Edition 2007
- Guidelines for the management of Hemophilia. Published by the World Federation of Hemophilia @World Federation of Hemophilia, 2005
- Hoffbrand AV, Catovsky D, Edward GD (eds) Postgraduate Hematology 5<sup>th</sup> ed. Australia: Blackwell Publishing 2005
- Rudisill CN, Hockman RH, Degregory KA, Mutnick AH, Macik BG. Implementing Guidelines for the Institutional Use of Factor VIIa (Recombinant): A Multidisciplinary Solution. Am J Health-Syst Pharm. 2006;63(17):1641-1646
- Transfusion manual: The clinical use of blood in medicine, obstetrics, paediatrics, surgery & anaesthesia, trauma & burns.
   World Health Organization. Blood Transfusion Safety GENEVA

Upcoming 13th PSH National Haematology Conference at the Children Hospital Lahore Workshops (10th, 11th, 15th Feb. 2010)

Date	Topic	Facilitator	Venue	
10-02-2010	Haematopathology	Dr. M. Tariq Mehmood	SKMC&RH, Lahore	
10-02-2010	Molecular Haematology	Prof. Shahida Husnain Dr. Hammad Tufail	Punjab University Lahore	
11-02-2010	Coagulation Medicine	Prof. Samina Naeem	K.E Medical University, Lahore	
11-02-2010	Blood Transfusion	Prof. Mehfooz ur Rehman	Institute of Blood Transfusion Services (IBTS), Lahore	
11-02-2010	Basic Haematology for Pathologist	Dr. Moona Azia; Dr. Muneeza Natiq Dr. Rabia Nadeem; Dr. Javeria Ejaz Dr. Noureen Saeed	The Children's Hospital & the Institute of Child Health, Lahore	
15-02-2010	Workshop for Medical Lab Technologist (MLT)	Dr. Nisar Ahmed; Mr. Hassan Ijaz Mr. Khalid Mehmood Mrs. Humaira Shehzad; Amir Gondal	The Children's Hospital & the Institute of Child Health, Lahore	

	Wednesday	Thursday, Feb. 10, 11, 2010 (Pre Conference Workshop)	ops)
Thursday Feb. 11, 2010 Day 1	Ibne Sina lect	ure: Prof. Dr. Khurshid Evidence Based Haematology	6.00pm
		Welcome Dinner	
Friday Feb. 12, 2010 Day 2	Session I	Symposium on safe blood transfusion Tea	9.00am - 11.00am 11.00am - 11.15am
	Session II	Symposium on Haematological malignancies Lunch & Friday prayer Break	11.15am - 1.00pm 1.00pm - 2.30pm
	Session III	Free Papers General body meeting (PSH)	2.30am - 4.00pm 4.00pm - 4.30pm
	Session IV	Corporate session (Novel Intervention in Haematology)	
		Grand Dinner	
Saturday Feb. 13, 2010 Day 3	Session V	Meet the Experts Breakfast	8.00am - 9.00am 9.00am - 9.30am
	Session VI	Symposium on Haemglobinpathies Tea	9.30am - 11.00am 11.00am - 11.15an
	Session VII	Free Papers (FCPS Trainees)* Lunch & Prayer	11.15am - 1.00pm 1.00pm - 2.00pm
	Session VIII	Symposium on bone marrow transplantation Concluding session	2.00pm - 3.30pm 3.30pm - 4.00pm
Gold medal	with Rs. 10,000	cash; Silver medal with Rs. 7,000 cash; Bronze medal wi	th Rs. 5,000 cash
Sunday Feb. Site Seeing			10.00am - 12.00pm 1.00pm - 2.00pm

## **Haematology Conference 2009**

National Institute of Blood Disease and Bone Marrow Transplantation under the patronage of Pakistan Society of Haematology had organized haematology conference 2009 with the theme Haematology Next Decade from 15th to 19th Oct.

On 15th Oct Haematopathology Workshop was conducted at NIBD under the supervision of Dr. Saba Jamal (Ziauddin University Hosp), Dr. Asad Chughtai and Dr. Tasneem Farza (NIBD). This workshop was most sought after among the haematology PGs. About 55 doctors attended the workshop. The interest of PGs can be gauged from the fact that workshop started at 09:00 hrs in the morning and finished at 20:00 hrs at night.

On 16th Oct four workshops were conducted. Haemostasis workshop at NIBD was supervised by Dr. Nadir Ali (AFIP), Dr. Bushra Moiz (AKUH) and Miss Arshi Naz (NIBD). Haemoglobinopathy workshop was supervised by Maj Genl Suhaib Ahmed (AFIP) and Dr. Saqib Ansari (NIBD). Immunohaematology and Molecular Biology workshops were conducted at Dr. Ziauddin Medical University Hospital and Sindh Institute of Urology and Transplantation Karachi respectively. These workshops were supervised by Brig Farhat Abbas Bhatti (PNS Shifa Karachi), Dr. Fatima Meraj & Dr. Saba Jamal (Ziauddin Hosp) at Ziauddin Hosp and by Dr. Rana Muzzaffar (SIUT), Dr. Salma Batool (SIUT), Dr. Sabia (SIUT) and Mr. Masood Ahmed (NIBD) at SIUT. About 90 candidates participated in these workshops.

Conference inaugural session was well attended in the evening of 16th October at Expo Center Karachi and Prof Khalid Zafar Hashmi was the Chief Guest. Dr. Tahir Sultan Shamsi started the proceedings from Talawat and Translation. He elaborated the idea behind the theme of conference and invited Chief Guest Prof Khalid Zafar Hashmi, Guest of Honor Maj Gen Farooq Ahmed Khan, President Pakistan Society of Haematologist Prof Khalid Hassan, President Elect of PSH Maj Gen Suhaib Ahmed, Chairman organizing committee Prof Mohsin Anvery and Chairman scientific committee Brig Muhmmad Ayub to stage. Prof Christoph Klien from Hanover Medical School Germany talked about Haematology in Next Decade. During the inaugural session special oration were made for two very prominent haematologists of the country Brig Khalilullah Hashmi and Dr. Syed Mujeeb-ul-Haq who sadly demised during the last few months. The prominent dignitaries who were present Prof Naeem Jaffery, Dr. Salman Adil, Dr. Nisar Ahmed, Prof Christoph Klein, Dr. Petro Sodani, Dr. Mauro, Brig Zahur-ur Rehman, Prof Fazal-e-Raziq, Col Farooq Khattak, Col Ifthikar Hussain Abdi, Col Tanveer Zia Quereshi, Brig Saleem Rana, Commodore Farhat Abbas Bhatti, Dr. Adnan Zuberi, Prof Waseem Iqbal, Dr. Samina Tufail, Prof Shahida Mohsin, Dr. Saba Jamal, Col Nadir Ali, Dr. Bushra Moiz, Dr. Muhammad Irfan, Dr. Asad Luqman, Dr. Ikram Burney, Brig Tariq Satti, Brig Pervaiz Ahmed, Lt. Col Nuzhat Mushaid, Dr. Shamvyl Ashraf, Prof Sirajuduallah and many others. The session was concluded after distribution of souvenir shields to guests, visit of dignitaries to scientific exhibition arranged by various pharmaceutical companies and followed by dinner.

On two days of conference in addition to Haematologist & Pathologist a large number of doctors from other specialties especially from Paediatrics and Gynae Obs attended the symposia. Total 13 symposia, including two plenary sessions, on various haematological aspects, ranging from Lab Haematology to Blood Transfusion and Bone Marrow transplantation, were arranged in which more than 50 presentations were made. Prof Moinuddin and Prof Khalid Zafar Hashmi's presentations created a lot of interest among the Haematology PGs.

The highlight of the conference was 63 poster presentations made by PGs, Haematologists and Technologists from Karachi, Jamshoroo, Multan, Lahore, Gujranwala, Rwawaipindi, Islamabad, Peshawar and Temargarrah NWFP. Best three posters were given awards. Poster presentations of Dr. Sehr Khaliq (FF Hosp Rwp), Miss Amber Ilyas (UHS Lahore) and Miss Zubaida Baher (OSF Karachi) were declared as Best, 2nd Best and 3rd Best Posters of the conference.

The most appreciated aspect of the conference was that 32 PGs were provided free accommodation at Pearl Continental Hotel Karachi and 8 PGs were given free return air tickets from Lahore, Islamabad and Peshawar,

It was an excellent academic exercise for PGs and Haematologists from all over the country which provided an opportunity to Haematologists from different cities to sit together and exchange their views regarding advancement in the field of haematology, better patient care, improvement in diagnostic services and provision of best possible training facilities to the postgraduate students.

# Haematology had its due share in 33<sup>rd</sup> Annual National Conference of Pakistan Association of Pathologists, held at PIMS Islamabad

Thirty third Annual National Conference of Pakistan Association of Pathologists was held in Pakistan Institute of Medical Sciences, from 6th to 8th November, 2009. Haematology institutions as well as haematologists participated actively. Preconference/post conference workshops, seminars and paper sessions, related with haematology, were very well in place. One preconference workshop, two post conference workshops and three sessions during conference were the main share of haematology, while in one symposium on AIDS the haematological aspect of the disease was also well elaborated. Haematologists from Armed Forces Institute of Pathology (Rawalpindi), Agha Khan University Hospital (Karachi), Children Hospital (Lahore), Pakistan Institute of Medical Sciences (Islamabad), Foundation Medical College (Rawalpindi), Rawalpindi Medical College, University of Health Sciences (Lahore) King Edward Medical College (Lahore), and other institutions presented their papers. Clinical, morphological and molecular aspects of different haematological problems were well addressed. One gold medal and two silver medals were awarded to three best papers in haematology



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# There are cells which defy characterization, but cells markers also need careful interpretation

Pakistan Society of Haematology, Rawalpindi Islamabad chapter meeting were held in Armed Forces Institute of Pathology on 30th October and 25th November 2009. Haematologists and post graduate trainees from Rawalpindi Islamabad participated. The hall mark of the session was different cases with problems in characterization, i.e., reactive versus malignant, lymphoid versus myeloid, polyconal versus monoclonal and haematological cells versus non-haematological cells. These problematic cases generated active discussion. Cases discussed had problem on routine and cytochemical stains, but appears as if immunological markers can also fall short off solving the diagnostic riddle. The immune markers also needs an interpretation giving due credence to patient's history, clinical findings, morphological findings on routine stains and cytochemical stains. Before ordering for immune markers the cost effectiveness should also be considered.



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# LETTER

# Haematology moot at University of Health Sciences, Lahore



Seminar on Hematology: A seminar on Haematology was conducted at university of Health Sciences on 15th August, 2009. Prof. M. H. Mubbashar, Vice chancellor of University of Health Sciences Lahore was the chief guest of the occasion. He highlighted the importance of Hematology, shortage of Haematologists and the need to produce more teachers in this area. He appreciated the efforts of Haematology department for organizing this academic activity. Prof. Abdul Hayee, Prof. Shahida Riaz Shah, Prof. Tahira Fayyaz, Dr Tahir Jamil, Dr.Asif Javed, Dr Nauman Malik, Dr Mona Aziz and Dr Nadia were present on the occasion. FCPS interns and M.Phil students from different institutes of Lahore, attended the seminar. Dr.Tahir Shamsi from National Institute of Blood Diseases & Bone Marrow Transplantation, Karachi delivered a lecture on the subject of Hemolytic anemia and discussed the practical approach towards the diagnosis of a case of haemolytic anemia. It was followed by an

Interactive session of case discussion. Detailed discussion on clinical manifestations, laboratory tests and diagnostic approach of bleeding disorders including, DIC, von willebrand disease and Haemophilia took place. It was an informative session, particularly for post graduate trainees. A morphology session took place in the afternoon. Cases of different types of anaemias, haemolytic anaemias and myeloprliferative disorders were discussed. At the end Dr. Shahida Mohsin thanked the participants and Prof. Tahir Shamsi,

Lecture on Stem Cell Transplantation: A Lecture on Introduction to Stem cell Transplantation was arranged at University of Health Sciences, Lahore on 2nd September 2009. Brigadier Tariq Mehmood Satti delivered a very comprehensive overview on principles of stem cell transplantation, types of, conditioning regimen, harvesting of stem cells, side effects and limitations of this procedure. It was a very informative lecture. The session was concluded by votes of thanks from Dr Shahida Mohsin, consultant haematologist University of Health Sciences.

# Thrombophilia Screening Workshop at PAEC Hospital, Islamabad



A Thrombophilia screening workshop was held at Pakistan Atomic Energy Commision Hospital, on 5th of November, as Pakistan Association of Pathologists Pre-Conference activity. The workshop was organized by Dr Samina Tufail Amanat, Head of Pathology department department PAEC Hospital Islamabad, with the objective to make the participants understand Thrombophilia and to make them able to screen patients for inhibitors, perform inhibitor assays, Protein - C, Protein - S and AntiThrombin III assays in a reliable way taking care about quality control. Scientific officer, Miss Arshi Naz from National Institute of Blood Diseases, Karachi, helped in the conduction of this workshop. About twenty people attended and participated in this workshop. In the first session, the participants were given lecture on the subject of Thrombophilia, Quality control in the Haemostasis lab and inhibitors. In the second session, all the participants were divided into five groups and given demonstration on the Inhibitor

screening and inhibitor assay which they performed themselves afterwards. They were also given demonstration on the Protein C, Protein S and Anti Thrombin III on the automatic analyzer which they also performed. All the participants were continually monitored and guided while they were performing the tests.

### Bone Marrow Trephine Biopsy Workshop at Islamic International Medical College



Department of Haematology Islamic International Medical College arranged one day bone marrow trephine biopsy workshop, on the eve of Pakistan Association of Pathologists Annual Conference, at 9th November 2009. Maj General Masood Anwar, Dr Nisar Ahmad and Dr Atifa Shoaib were the moderators. Hematologists and post graduate trainees from different institutions across the country participated. All the participants were given cases along with the history and relevant haematological findings. At the end in an interactive session the cases were discussed along with their multimedia images.

# **PSH Executive Committee Meeting at PIMS, Islamabad**

An Executive Committee meeting, of Pakistan Society of Haematology(PSH), was held on 7th November 2009, 2nd day of Pakistan Association of Pathology National Conference. Venue was MCH Centre Pakistan Institute of Medical Sciences Islamabad .Prof Khalid Hassan (President PSH), Maj General Suhaib Ahmad, Brig Pervaiz Ahmad, Dr Samina Amanat, Dr Fazal- e- Raziq and Dr Nadeem Ikram attended the meeting. Latter on different haematologists attending the PAP conference joined in the meeting. Meeting



### **PSH Executive Committee Meeting at PIMS, Islamabad**

Was started with the prayers for the departed souls of Brig Khalil Ullah and Dr Syed Abdul Mujeeb. Prof Khalid highlighted about the services of both of them for the medical professional in general and haematology in special. Progress of the local PSH chapters was discussed. President society briefed about his visit to Karachi and Lahore to attend local chapters meetings. Prof Fazal-e-Raziq informed about the monthly meeting of PSH Peshawar. It was decided to activate membership drive and to send membership forms to all local chapters. Armed Froces Institute of Pathology was requested to look into the possibility of organizing morphology review cases programme. Col Nadir was asked to fond out the feasibility of the project. "Case reports" series on PSH web site was discussed and all the chapters were confided to contribute into this case report series, so as to have a sizeable directory of cases reports. Prof Khalid informed about up boosting of the PSH web site. He informed that the number of people visiting web site is increasing gradually. Brig Pervaiz informed about American Society of Haematology (ASH) "International Out reach Programme", and mentioned it as a good programme for trainees. Prof Khalid Hassan highlighted the requirement of a haematology text book, in relation with local requirements. He updated about the progress about haematology annual book. All the participants spoke about the need of haematology workshops at district levels. Maj General Suhaib Ahmad proposed to have a team of trainers for these workshops. Letter from Dr Mussarat Niazi, organizing secretary PSH Peshawar conference was discussed. It was decided to deal with the matter in accordance with the PSH constitution Concern of diagnostic companies about more frequent conferences and to finance them was also discussed.





### Your views and news

Dear Colleagues: Your contributions to PSH newsletter are backbone to its success. Please send short communications, case reports, scientific activities and developments in your departments and issues of common interest. Photographs of scientific events/meetings are also welcome. Members are requested to visit PSH website and post in their contributions.

### Update Address

Please update your addresses in case there is any change in it. All members are requested to email us their mobile/phone contact and email address.

### Address for Correspondence Dr Nadeem Ikram

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### THROMBOMAX

Recombinant Human Interleukin 11

