Global Thrombosis Forum

Virtual High School Scholars' Day

Friday, July 16, 2021

1:00pm – 4:00pm

https://luc.zoom.us/j/86260755522

Loyola University Health Science Division

Consistent with The North American Thrombosis Forum objectives, training and educational initiatives the Global Thrombosis Forum, under the leadership of Dr. Atul Laddu, has made a major impact in inspiring public sectors, in particular younger students to promote awareness of thrombosis and its management at various levels. Such programs have recruited talented younger scholars who have participated in educational and translational research programs in an exemplary fashion. Since its inception, Global Thrombosis Forum has worked with Loyola University on various initiatives in promoting these activities. The summer research scholar's program at various institutions including Loyola University, NorthShore University Systems, Albany College of Pharmacy and Harvard University have provided major platforms for the younger students to carry out translational research projects which have resulted in the participation at national and international meetings and publications.

The COVID-19 pandemic has made a major impact on our educational and research programs at the Health Sciences Division of Loyola University Chicago. The University is committed to its primary mission in continuing our academic programs. Consistent with our educational mission we have converted our courses and other communication to students to a virtual format. This year's GTF High School Scholar Summer Research program is planned in the virtual format in which students and faculty contributed with several innovative approaches to carry out assigned projects in an effective manner. This involved periodic group sessions, individual faculty / student interactions and scheduled didactic presentations relevant to assigned biomedical research in an integrated fashion. The concept and implementation of the virtual program was supported by the Vice Provost, Dr. Singh who has provided guidance and support. With this advanced communication and the utilization of various platforms such as Zoom students were continually in touch with the faculty and mentors. With this platform this program will continually evolve and will offer students who are not able to physically participate on site the ability to participate.

Dr. Callahan, Provost, Loyola University Chicago, has been extremely supportive of the GTF / Loyola initiatives and has provided guidance and leadership to carry out these missions. Under the strong leadership of Dr. Sam Goldhaber, President of the NATF and Dr. Atul Laddu, President and CEO of GTF, these programs will continue to expand in various formats. This will provide opportunities for younger students which will be helpful in their career planning and education to become physicians and scientists to serve healthcare and biomedical research programs.

AGENDA

1:00 – 1:30 Welcome Addresses

Dr. Jawed Fareed

Dr. Atul Laddu

Dr. Meharvan Singh

Provost Margaret Callahan

Student Presentations

1:30 *Collagen Remodeling, Inflammatory Biomarkers and Fatty Acid Regulation in Understanding the Pathogenesis of Atrial Fibrillation*

Sanket Gavankar

1:40 *Molecular and cellular pathogenesis of endothelial lining in atrial fibrillation*

Prasad Shetye

1:50 *Oxidative Stress Biomarkers and Their Relevance to Fatty Acid-Binding Protein (FABP) in Stage Five Chronic Kidney Disease on Hemodialysis (CKD5-HD)*

Rishima Sharma

2:00 *Thrombo-inflammatory biomarkers of cardiorenal syndrome in patients undergoing maintenance hemodialysis in end-stage renal disease (ESRD)*

Anushka Bhate

2:10 *Public Perception of Current COVID-19 Vaccinations. Results of a Pilot Survey*

Krishan Patel

2:20 *Cancer & VTE*

Anusha Tembe, Ria Chokshi

2:30 *Covid-19 and Vaccines*

Ashay Bongirwar, Mrunalini Ghangrekar

2:40 *COVID-19 & Anticoagulation*

Rishi Bappanad, Shivangi Ranjan

2:50 *DOAC's*

Meghana Malempati, Roumika Patil

3:00 *Andexanet Neutralization of Heparin*

Joseph Lewis

3:10 *Absolute Quantification of Glycosaminoglycans by Using a Fluorescence Method*

Emily Bontekoe

Posters

3:20 *COVID-19 and stroke*

Mala Niverthi

3:30 *Latinos and VTE*

Dia Pise

3:40 *Management of COVID-19*

Neha Koganti

ABSTRACTS

Collagen Remodeling, Inflammatory Biomarkers and Fatty Acid Regulation in Understanding the Pathogenesis of Atrial Fibrillation

Sanket Gavankar – Medical Student Partner: Gabriel Dungan

Introduction: Atrial Fibrillation (AF) is the most common sustained form of cardiac arrythmia across the world with around 3 million active cases.[5] The exact pathogenesis of AF is unknown. AF is caused by misfiring of the SA node, the start of the conduction system. The abnormal rhythms from the misfiring in the SA node are atrial arrythmias. Atrial fibrosis is the process by which collagen is deposited within the atria.[3] Certain abnormalities in the structure,

structural remodeling with collagen remodeling proteins, can cause atrial fibrosis.[3] Atrial fibrosis is correlated with AF. PINP and PICP, the two collagen remodeling proteins focused on in this study, are procollagen type I remodeling proteins and effective biomarkers of collagen deposition and bone formation.[2] PINP exhibits diurnal variation with higher values occurring at night resulting in variance within the data set for PINP in AF patients.[4] Long chain fatty acids (LCFAs), in excess, can lead to lipotoxicity which increases the risk of a potential arrythmia. Fatty Acid Binding Proteins (FABPs) bind to LCFAs to create a lower level of these fatty acid chains in the cytoplasm. [1] Increased LCFAs has a direct correlation with increased FABPs which can ultimately increase the risk of arrythmia.
Purpose: The purpose of this study was to analyze levels of collagen remodeling proteins, specifically PINP and PICP, and L-FABP in an AF cohort to determine whether they can serve as viable biomarkers in the management and diagnosis of AF.
Hypothesis: It is expected that there will be an upregulation of collagen remodeling proteins, inflammatory biomarkers and FABP in AF patients compared to the NHP.
Materials and Methods: The study was conducted with a sample of 50 normal healthy human plasma and were tested for PINP, PICP, and FABP levels. These normal samples were purchased from George King Biomedical. The blood of the AF patients was collected following IRB protocol, centrifuged, and aliquoted at –80 degrees Celsius. AF plasma samples were analyzed using sandwich ELISA Kits.
Statistical Analysis: Statistical data was collected and recorded on Microsoft Excel spreadsheets for PINP, PICP, and FABP. Evidence of an upregulation was recorded as bar graphs and scatter plots using the PRISM Software; quartile analysis was conducted using the IBM SPSS software. Nonparametric paired t tests were used for data that was normal, while the Mann-Whitney t test was used for data that failed the normality tests.
Results: The results were collected as mean ± SEM with a percent change of mean (%) to demonstrate upregulation. All three biomarkers PINP, PICP, and FABP demonstrated an upregulation, respectively, of (422.32 ± 43.78, 164.47%), (1.395902 ± 0.178727, 104.86%), and (13186.7517 ± 4256.96265, 157.75% with the outlier and 77.69% without outlier). All three biomarkers were statistically significant with p-values of <0.0001, <0.01, and <0.0001 respectively for PINP, PICP, and FABP. There was a significant outlier in the FABP data at 295.778.86 pg/mL. This value created a skewness statistic of 7.502 which changed to 3.795 after the outlier was removed.
Conclusion: The results prove that increased structural remodeling, proven by higher levels of collagen remodeling proteins, can indicate AF. FABP had an evident upregulation in the AF patient, but the data was severely skewed right due to an outlier. Once the outlier was removed, the data still demonstrated an upregulation of 77.69%. Elevated levels of these biomarkers suggest that they can serve as a potential tool to use in the management and diagnosis of AF.

Molecular and cellular pathogenesis of endothelial lining in atrial fibrillation

Prasad Shetye – Medical Student Partner: Ameer Odeh

Introduction: Atrial Fibrillation (AF) is a cardiac arrhythmia that is caused by a miscoordination between the heart's upper and lower chambers. This condition can lead to suboptimal blood flow to the lungs and body, and blood may also begin to pool in the heart.[1] This condition can cause several complications, including blood clots (often a consequence of the pooled blood) which can then travel to other parts of the body and cause more severe complications such as stroke.[2] Today, AF is estimated to affect between 2.7 and 6.1 million individuals in the United States; however, this incidence is expected to rise to 12.1 million by 2050.[3] von Willebrand Factor (vWF) is a glycoprotein that aids the formation of blood clots by helping platelets adhere to the blood vessels and to one another.[4] Once a blood clot begins to break down, it releases a protein fragment known as D-Dimer. Due to the nature of its production, D-Dimer levels can often be used as an indicator for the presence of a blood clot in the circulatory system.[5] Interleukin-6 (IL-6) is a cytokine that helps regulate immune response. It is produced by monocytes and macrophages in response to an infection or a tissue injury.[6]

Purpose: The aim of this research was to analyze how levels of biomarkers of inflammation and thrombosis vary between AF patients and a normal human plasma group (NHP).
Hypothesis: Biomarkers of inflammation and thrombosis are present at higher levels in AF patients when compared to an NHP group.
Materials and Methods: The AF samples (n=53) were collected following the IRB protocols at Loyola University Medical Center and Loyola Heart & Vascular clinics, while the NHP group blood samples (n=48) were obtained from a centralized blood bank known as George King Biomedical (Overland Park, Kansas). vWF, D-Dimer, and IL-6 levels were measured in both the AF group and the NHP using commercially available sandwich ELISA kits.
Statistical Analysis: The biomarker levels were analyzed using PRISM GraphPad, IBM Statistical Package for Social Sciences (SPSS), and Microsoft Excel for important statistical characteristics, including mean, median, mode, standard error of the mean (SEM), standard deviation, minimum, maximum, and interquartile range. In addition, tests for normal distribution, quartile analysis, unpaired t-tests, skewness, correlation analysis, and Mann-Whitney tests were conducted. Lastly, the data was broken down into every tenth percentile to assess the distribution of the data.
Results: The data was organized using the following format: Mean ± SEM. When all the biomarkers were compared, there was no significant correlation between the three (all correlations were positive with r-values below 0.2); however, they all showed an upregulation in the AF group when compared to the NHP group. For vWF, there was a 6663.785% increase in the AF group (AF 4796.200 ± 286.155 vs. NHP 70.910 ± 7.268). For D-Dimer there was a 386.549% increase in the AF group (AF 913.379 ± 125.634 vs. NHP 187.726 ± 31.320). Lastly, for IL-6 there was a 253.002% increase in the AF group (AF 4.409 ± 1.125 vs. NHP 1.249 ± 0.178). Furthermore, when the statistical significances between the biomarkers and the NHP group were analyzed, it was found that all three data groups held a p-value less than 0.05 (<0.001 for vWF, <0.001 for D-Dimer, and 0.0087 for IL-6), deeming the data statistically significant and thus the null hypothesis is rejected for all three data sets.
Conclusion: The above research supports the hypothesis that there will be an upregulation in biomarkers of inflammation and thrombosis (vWF, D-Dimer, IL-6) in AF patients.

Oxidative Stress Biomarkers and Their Relevance to Fatty Acid-Binding Protein (FABP) in Stage Five Chronic Kidney Disease on Hemodialysis (CKD5-HD)

Rishima Sharma – Medical Student Partner: Divya Sridharan

Introduction: CKD5 is the final stage of chronic kidney disease in which the patient has end stage renal disease (ESRD) and their kidneys are about to fail. Experts estimate that around 37 million people in the United States have chronic kidney disease. Given the increasing number of cases of CKD5, understanding how it works could improve the patient's outcome and increase their chances of survival. One of the larger factors that contributes to the progression of renal failure is oxidative stress. Oxidative stress occurs when there's an imbalance between free radicals and antioxidants in the body. DNA, proteins, and lipids can become damaged as a result of this imbalance. Stable derivatives of oxidants are used as biomarkers of oxidative stress. When renal damage occurs, likely due to oxidative stress, the levels of biomarkers will likely be more elevated in ESRD patients compared to control samples. L-FABP is a cytoplasmic protein involved in facilitating and transporting long-chain polyunsaturated fatty acids and is very significant in many research experiments related to CKD5.
Purpose: The purpose of this research project is to explore the relationship between oxidative stress biomarkers in ESRD patients and how the presence of ESRD contributes to the concentration of these biomarkers in patients.
Hypothesis: The concentrations of oxidative stress biomarkers in ESRD patients will be elevated in comparison to the concentrations of them in control patients.
Materials and Methods: Blood samples were collected from CKD-5 patients and stored in sodium citrate tubes and centrifuged to divide

the resultant plasma into aliquots. Control samples were purchased from a commercial vendor. The CKD-5 and control samples were used to profile the biomarkers through ELISA kits. The statistical and correlation analysis was done through PRISM GraphPad software and IBM SPSS.

Statistical Analysis: Multiple statistical analysis tests were run to determine the correlation among the biomarkers and whether the data was statistically significant. Correlation analysis, Mann-Whitney U tests, normal distribution, skewness tests, and quartile analysis tests were done through PRISM Graphpad Software and IBM SPSS.
Results: The results are shown in terms of Standard Error of the Mean (SEM). L-FABP showed statistically significantly higher values in ESRD patients compared to control patients. L-FABP- (ESRD 18132.009 v.s. Control 250.02). PAI-1- (ESRD 1.40232 v.s. Control 2.83321). NO- (ESRD 2.29502 v.s. Control 0.78238).
Conclusion: There was a weak correlation between the biomarkers but ESRD patients showed highly elevated levels of L-FABP in comparison to NO and PAI-1. The results suggest that impaired renal function and kidney damage contribute to the marked increase of L-FABP in ESRD patients.

Thrombo-inflammatory Biomarkers in Patients with End-Stage Renal Disease

Anushka Bhate – Medical Student Partner: Pranathi Karumanchi

Introduction: End-stage renal disease (ESRD)- the final stage of chronic kidney disease- is a life-threatening condition in which an individual's kidneys completely cease function, and dialysis or a kidney transplant is required in order for the individual to survive.[1] As of 2018, the United States had 131,636 documented cases of ESRD, with its prevalence being 2,242 cases per million people.[2] This number is expected to rise over time, but the mortality rate of ESRD is expected to decline with improved treatments and greater access to treatment. In the United States, the most common causes of ESRD are high blood pressure and diabetes, as these conditions can cause damage to one's kidneys.[3] These conditions can also lead to an individual developing a state of inflammation, such as atherosclerosis. Interleukin (IL) 6 is a mediator of acute inflammation and fever that stimulates the autoimmune and inflammatory process in several diseases, such as atherosclerosis.[4] Tumor necrosis factor alpha (TNF-α) is an inflammatory molecule produced during acute inflammation.[5] D-dimer is a fibrin degradation product, and the estimation of its concentration can be used to help diagnose thrombosis.[6]
Purpose: The purpose of this research project was to analyze concentrations of thrombo-inflammatory biomarkers in ESRD patients compared to the general population, and their role in the development of ESRD.
Hypothesis: It is hypothesized that circulating levels of thrombo-inflammatory biomarkers of kidney disfunction may be elevated in ESRD patients.
Materials and Methods: This study was conducted using plasma samples from 95 ESRD patients. The samples were centrifuged to produce platelet poor plasma, aliquoted, and frozen at -80 degrees Celsius. Sandwich ELISA kits were used to measure levels of D-dimer, IL-6, and TNF-α in the ESRD patients' blood plasma samples. 50 samples of normal human plasma (NHP), commercially obtained from a centralized blood bank, served as a control group for comparison.
Statistical Analysis: Statistical analyses were conducted to determine statistical significance of the data and to identify any correlation between the biomarkers. Tests for normal distribution, t-tests, Mann-Whitney tests, skewness tests, quartile analysis, and correlation analysis were conducted using PRISM GraphPad and IBM Statistical Package for the Social Sciences (SPSS) software to analyze the data. The p-values were compared to the α-level of 0.05 to determine statistical significance.
Results: The results were compiled as Mean ± Standard Error of the Mean (SEM). D-dimer, IL-6, and TNF-α showed statistically significantly higher concentrations in ESRD patient blood plasma (ESRD 1447.01 ± 215.79 ng/mL vs. 187.73 ± 30.05 ng/mL, p-value < 0.0001), (ESRD 5.21 ± 1.46 pg/mL vs. 1.25 ± 0.18 pg/mL, p-value <

0.0001), and (ESRD 2.515 ± 0.15 pg/mL vs. 1.73 ± 0.15 pg/mL, p-value = 0.0006), respectively. Additionally, a low, positive correlation was reported among each of the biomarkers. Thus, subjects with ESRD had higher levels of D-dimer, IL-6, and TNF-α, likely due to these biomarkers' relation to inflammation and kidney dysfunction. Conclusion: This research confirms the hypothesis that the levels of thrombo-inflammatory biomarkers (D-dimer, IL-6, and TNF-α) in ESRD patients show statistically significant elevation. These results create a pathway towards the potential future diagnosis of patients with ESRD using thrombo-inflammatory biomarkers.

Public Perception of Current COVID-19 Vaccinations. Results of a Pilot Survey

Krishan Patel - In Collaboration with Dr. Bulent Kantarcioglu

Introduction: After its emergence in China, the COVID-19 pandemic has spread rapidly around the world, affecting all of our lives. Over the past few months, different vaccines have been issued to the public following FDA approval. Since their release, the number of COVID-19 cases in the United States have gone down significantly. However, there is a long way to go until the eradication of the virus. There has also been a strong emergence of delta variants across the world, which (for the most part) can still be partially blocked by vaccines. This is why it is so important everyone gets a vaccine for COVID-19.
Purpose: The purpose of this project was to determine the public's opinion of COVID-19 and the COVID-19 vaccines, while also determining correlation between different demographics and these opinions.
Hypothesis: There are many different factors within various demographics that cause a correlation to a certain belief regarding COVID-19 and COVID-19 vaccines.
Materials and Methods: This study was conducted in collaboration with Loyola University Chicago. Survey questions about COVID-19 and COVID-19 vaccinations have been sent electronically to the respondents. Initial results based on a pilot study where the answers from 250 respondents were compiled.
Statistical Analysis: Basic descriptive statistics were used to characterize the sample and study variables. Univariate analysis of associations between categorical variables and vaccination intent and acceptance were assessed by chi-square statistics. Multivariate analysis performed by regression analysis to determine significant independent predictors. A p-value of less than 0.05 was considered to indicate statistical significance; all tests were 2-tailed.
Results: In our study population vaccine willingness have been found as 94,4%, the rate of receiving at least one dose of vaccination have been found as 90,8%. In univariate analysis, gender, believing that vaccinations protect others and having enough information about safety and efficacy of vaccines have been found significant factors for vaccine willingness. For receiving at least one dose of vaccination, gender, previous COVID-19 infection, believing that vaccinations protect others, having enough information about safety and efficacy of vaccines, the degree of COVID-19 related effects on person's life, knowledge that COVID-19 can cause blood clots and the degree of concerns about delta variant have been found significant factors for vaccine willingness. In multivariate analysis only believing that vaccinations protect others have been found as an independent factor for vaccine willingness. For receiving at least one dose of vaccination, believing that vaccinations protect others, the degree of COVID-19 related effects on person's life and having enough information about safety and efficacy of vaccines have been found independent factors in multivariate analysis.
Conclusion: The development of vaccines against COVID-19 infection represent the remarkable scientific and clinical development with profound impact on the control of this pandemic. There are several vaccines currently available in the United States. All of these vaccines provide immunity against COVID-19 and its variants which have been identified in 2020 and 2021. The level of immunity and the reported adverse events vary with each of the vaccines. Despite minor issues the vaccination outweighs the benefits and provides a clear approach to control this pandemic. Several public concerns have been

raised and addressed adequately. Despite this, there is some reluctance and fear of unfavorable outcomes. To address some of these issues, a survey was conducted electronically addressing such issues as the preference of vaccine, public perception of the benefits and other issues related to the acceptance of the vaccination program. Initial results based on a pilot study where the answers from 250 respondents were compiled. This presentation will provide a summary of the initial analysis on the results which will be the subject of a manuscript. A large survey program addressing international participants is being planned.

Cancer & VTE

Anusha Tembe, Ria Chokshi

Cancer and VTE have impacted the medical community greatly. We researched cancer and VTE to determine the causes, effects, and impacts of cancer and VTE in a patient. Our research found that cancer and VTE are related. Cancer-related VTE can be treated with anticoagulants (Heparin, DOACs). Cancer and VTE is a two-way street and with proper medical care, treatment regimens and prevention guidelines, VTE can be managed to reduce VTE recurrences in cancer patients.

Covid-19 and Vaccines

Ashay Bongirwar, Mrunalini Ghangrekar

Since the inception of the pandemic, there have been 25 million cases of COVID-19 and over 602,000 deaths. Throughout the pandemic, there have been many myths and speculations of different drugs and practices that can help cure the virus but it was only in late 2020 that the first confirmed vaccine was developed. Currently, the Pfizer, the Moderna, and the Johnson and Johnson vaccines are being distributed across the country. We researched the information about 3 vaccines that have been approved by the FDA.

COVID-19 & Anticoagulation

Rishi Bappanad, Shivangi Ranjan

The COVID-19 pandemic has affected millions of people worldwide. Besides COVID-19 affecting several organs in the body, it has increased the incidence of thrombotic conditions, especially hospitalized patients who are at high risk for developing thrombotic conditions. Thrombosis continues to remain an important concern in these patients. The authors have researched the possible relationship of COVID-19 and risk of thrombosis, its management and prevention.

DOAC's

Meghana Malempati, Roumika Patil

Over the past many years we have seen a steady increase in the options for anticoagulants. Direct Oral AntiCoagulants (DOACs), introduced in 2010, are the latest addition to the list of anticoagulant agents: Direct thrombin inhibitors (DTIs) and direct factor Xa inhibitors. The DOACs possess several advantages over the traditional agents such as warfarin and heparin. The DOACs have one disadvantage: the high cost. Bleeding following the use of DOACs can be managed using reversal agents. Despite the cost and safety issues, DOACs have carved a major role in medicine.

Andexanet Neutralization of Heparin

Joseph Lewis, Recipient of Callahan Summer Research Fellowship

Introduction: Andexanet Alfa is an antidote for the neutralization of the bleeding effects of Direct Oral Anticoagulant (Direct Xa agents) agents such as Rivaroxaban and Apixaban. It represents a molecularly modified factor Xa decoy protein with high specificity for factor Xa inhibitors. Unfractionated heparin (UFH) and low molecular weight heparins (LMWHs) exhibit both anti-Xa and anti-IIa activities. The purpose of this study is to investigate the relative neutralization of the anti-coagulant effects UFH and enoxaparin by andexanet alfa in whole blood assays such as activated clotting time (ACT) and thromelastography (TEG).

Methods: The neutralization profiles of UFH and enoxaparin were studied by Andexanet at various concentrations. The final concentration of UFH used for activated clotting time (ACT) was 10 µg/ml, and for enoxaparin was 25 µg/ml. Andexanet was used in a concentration range of 12.5 ug/ml.

For the thromboelastographic (TEG) analysis the concentration of all drugs were proportionately reduced.

Analysis: The results were analyzed using R open-source statistical software. In order to compare the means of the groups, analysis of variance (ANOVA) tests was performed. If the ANOVA test yielded a significant result, a Tukey post-hoc analysis was performed. A pearson correlation was run for each parameter with respect to the dose of the drug.

Results: Andexanet at 200 ug/ml moderately neutralized UFH (302 s vs 198). Andexanet minimally neutralized enoxaparin (200 s vs 190 s). There was no concentration dependent change in the neutralization profiles of UFH and enoxaparin at a concentration range of 12.5 ug/ml - 200 ug/ml. In the TEG assays, Andexanet alfa at 10 ug/ml partially neutralized the anticoagulant effects of UFH at 1 ug/ml as measured by various TEG parameters. At 20 ug/ml, stronger inhibition of all parameters was noted.

Discussion: These studies suggest that Andexanet Alfa may be an effective neutralizing agent for UFH, however, it is ineffective in neutralizing LMWH at the concentrations studied. It is interesting to note that LMWHs have a higher anti-Xa to IIa ratio in comparison to heparin, however, their neutralization is lesser with Andexanet. These studies suggest that andexanet can be used in combination with protamine sulfate to neutralize UFH.

Absolute Quantification of Glycosaminoglycans bu Using a Fluorescence Method

Emily Bontekoe. Recipient of Callahan Summer Research Fellowship

Background and Objective:
Activated partial thromboplastin time (aPTT) method is widely used as a routine blood test and is commonly used for the monitoring of heparin levels in clinical patient samples. However, many endogenous factors contribute to observed prolongation of this test. Heparin Red assay utilizes fluorescence for the direct and sensitive detection of the absolute level of heparin in plasma. The purpose of this study is to compare functional activities (anticoagulant and anti-Xa levels) in clinical patient samples to the absolute levels of heparin to determine endogenous activity upon the therapeutic administration of this agent.

Methods:
Plasma samples from patients treated with therapeutic dosage of heparin (n=100) were collected from Loyola University Medical Center. Citrated blood samples were analyzed using aPTT clotting method, anti-Xa chromogenic assay and Heparin Red (Redprobes UG, Deutschland) assay relative to a commercially used heparin (Medefil) calibration curves. Normal controls were comprised of commercially available 25 male and 25 female citrated plasma samples (George King Biomedical, Overland Park, Kansas City). Results were compiled as mean ± SEM and analyzed for significance and correlation.

Results:
Marked increases were noted in aPTT (81.11±7.37, normal 30.16±0.80 sec.; $p<0.001$), anti-Xa (43.90±2.83, normal 0±0 % Inhibition; $p<0.001$), and Heparin Red recovered concentration (2.90±0.16, normal 0.07±0.03 ug/ml; $p<0.001$) in clinical samples compared to normal controls. Although a large scatter in data in all of the assays was noted and shown in Figure 1, significant correlations were observed between Heparin Red and other functional parameters studied.

Conclusion
These studies demonstrate that Heparin Red method is a reliable assay for the absolute quantification of circulating heparin level in plasma. Unlike the functional methods, which are also influenced by many endogenous factors, such as AT levels and variations in the clotting proteins, Heparin Red detects absolute amounts of circulating heparin in plasma which are not influenced by endogenous factors and other anticoagulant drugs.

Poster Presentations

COVID-19 and stroke

Mala Niverthi

Since the inception of Covid-19 on March 11, 2020, Covid-19 has affected several organs in the body including the lungs, heart, and the brain. Covid-19 produces multiple symptoms ranging from cough, fever and chills, pain or pressure on the chest, to even stroke. In- hospital mortality is higher in patients with stroke and COVID-19 compared to historical non-COVID-19 patients. The management of stroke following Covid-19 is very similar to that of stroke patients without Covid-19. Use of Recombinant Tissue Plasminogen Activator (rtPA) and Thrombectomy are some of the common therapies used to manage COVID-19 induced stroke.

3:20 *Latinos and VTE*
Dia Pise

Latin Americans (Latinos) make up about 18% (60 million) of the 328 million population of the US. Most of the Latino population is concentrated in the South, Southwest, and Western parts of the U.S. Latinos have a significantly lower prevalence of VTE compared to Caucasians, but higher than Asians/Pacific Islanders. The reasons for the high occurrence of thrombosis in this population is a complex interplay between genetic and environmental risk factors. Obesity and diabetes cause a higher risk of VTE to the Latino race. We conclude that there is a strong correlation between genetic factors and the incidence of thrombosis in Latin Americans, although they still have one of the lowest VTE rates throughout all the races.

Management of COVID-19
Neha Koganti

COVID-19 is a pandemic that has killed millions of lives across the globe and has changed people's daily lives. This virus caught the world by surprise since no one was not prepared for such a pandemic and there were no existing vaccines and treatment modalities.
Diagnostic COVID tests have now been developed to detect the virus in the body. Three vaccines have been approved by the FDA (J&J, Moderna and Pfizer), which produce antibodies in the blood. A few therapies have been developed to manage COVID-19. Despite a small progress has been made, COVID-19 continues to be an overwhelming challenge to the world.

Acknowledgements

The planning committee for the virtual High School Scholar's Day gratefully acknowledges the support and encouragement of Dr. Sam Goldhaber, President of NATF and Kathryn Mikkelsen, Executive Director of NATF. We are also thankful to Provost Margaret Callahan, Dr. Meharvan Singh and Dr. Eva Wojcik, for their patronage and support for this program. Special thanks are extended to the parents and the GTF board for their efforts and help in making this program possible. The expert coordination of this program by Dr. Debra Hoppensteadt and Ms. Erin Healy-Erickson is also gratefully acknowledged.