

Focus

Bleeding and Thrombotic Disorders in Women

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Bleeding and Thrombotic Disorders in Women

On the 8th of March 2022, on the occasion of International Women's Day, Werfen organized the launch session of a series of webinars and events with the aim to increase awareness on a sensitive topic: Bleeding and Thrombotic Disorders in Women.

This introductory session was moderated by Prof. Elvira Grandone, Associate Professor of Obstetrics and Gynaecology at the University of Foggia.

The first speaker, Naja Skouw-Rasmussen, is a patient with a bleeding disorder and an advocate, Think Tank Officer at the European Hemophilia Consortium. She described in her talk the challenges surrounding women with bleeding disorders, focusing on the lack of recognition and adequate medical attention. She highlighted a survey conducted by the European Hemophilia Consortium in 2017, in which over 700 answers were received from patients and caregivers around Europe and found that women with bleeding disorders are often misdiagnosed and the treatment provided may not address their specific needs, with a high impact on the life of those patients. Another key point was the importance of communication between patients and clinicians on bleeding events and menstruation, pointing to anamnesis as a fundamental step in the diagnosis.

She goes on to emphasize the need to improve the research in bleeding disorders in women enhancing equal access to services to reduce the current gap in the diagnosis.

The second part of this session is led by Prof. Savino Sciascia, Associate Professor at University of Turin, and focused on the thrombotic side of the hemostatic disorder.

His talk addressed the antiphospholipid syndrome (APS), a condition that can cause acquired thrombophilia and is responsible for 10-20% of recurrent miscarriages. The challenge with APS diagnosis is that not all patients with antiphospholipid antibodies will develop the disease, making it difficult to be managed.

Prof. Sciascia discussed the classification criteria for APS, focusing on how to improve the diagnosis of obstetric APS and assess the risk stratification to guide the patient management.

He indicated the importance to change the paradigm to consider antiphospholipid syndrome as a biomarker of a disease but to consider the positivity to antiphospholipid antibodies as a risk factor in the development of thrombosis. The path suggested by the Professor is to increase the communication among physicians with a multidisciplinary team, and equally important is to improve communication with the patients.

In the online seminar, he also mentioned the fundamental role played by the tests to identify the positivity and the need to use high sensitivity and specificity tests, such as lupus anticoagulant, anticardiolipin, and anti β 2GP1, APS/PT testing, improving the ability to identify the thrombotic risk in pregnancy.

The following presentations focus on goal directed bleeding management, with Dr. Klaus Goerlinger, Werfen Medical Director who discusses the issue of post-partum hemorrhage as a preventable cause of maternal morbidity and mortality, and Dr Sarah Bell, Consultant Anaesthetist Intensive Care and Pain Medicine Cardi and Vale University, who shares her experience from Cardiff, where thanks to the implementation of an institutional protocol in post-partum bleedings they could reduce unnecessary transfusions while improving clinical outcomes through a goal directed approach.

In his presentation, Dr. Goerlinger discusses the causes and implications of bleeding in obstetric patients, whose amount of blood loss is often underestimated. While there have been some improvements in managing the problem globally, post-partum hemorrhage remains a global problem with varying levels of importance and impact across different countries. Detecting and managing coagulopathy is fundamental for the management of post-partum hemorrhage, cause those patients who are diagnosed with coagulopathy are associated with significantly higher odds of requiring massive transfusions, hysterectomies, and experiencing significant morbidity.

Additionally, Dr. Goerlinger discusses the risks associated with transfusion-related mortality, including transfusion-related acute lung injury, transfusion-associated circulatory overload, and transfusion-related immunomodulation with micro-infection. He notes that these risks are primarily related to the improper use of blood products rather than problems with the product itself. To address these issues, Dr. Goerlinger suggests the use of viscoelastic testing as an essential part of patient blood management. He emphasizes that the goal is to minimize bleeding and blood loss, not just to save blood products, and that patient safety is of the utmost importance.

Speakers: Prof. Elvira Grandone

Associate Professor of Obstetrics and Gynecology at University of Foggia
Head of Thrombosis and Hemostasis unit at Research Institute
"Casa Sollievo della Sofferenza", S. Giovanni Rotondo

Naja Skouw-Rasmussen

Patient with bleeding disorder
Think Tank Officer at European Hemophilia Consortium Think Tank

Prof. Savino Sciascia

Associate Professor and Researcher at the Center of Research of Immunopathology
and Rare Disease at University of Turin

Dr. Klaus Görlinger

PBM Medical Director – Werfen

Dr. Sarah F. Bell

Consultant Anaesthetist Intensive Care
and Pain Medicine Cardi and Vale University



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FXIII and Post-Partum Hemorrhage

In this session, Professor Wolfgang Korte shares an update about the pathophysiology of post-partum blood loss, or post-partum hemorrhage (PPH), and the PPH 1300 study performed in combination with the Obstetrics Department of the University Hospital in Zurich (Switzerland).

PPH is a major cause of maternal morbidity and mortality and is responsible for 30% of maternal deaths worldwide with an equivalence worldwide of 10 women every hour.

The incidence of severe PPH is also increasing due to the aging of parturition women. This is especially of concern in the industrialized countries where it moved from around 2 in 1999 to approximately 4 in 2008 for every thousand deliveries, indicating that this has essentially doubled.

The identification of the disease usually starts from the **4T's** (uterine atony, retained placenta, trauma, clotting disorders) that can cause relevant post-partum blood loss, which represents 75% to 90% of cases.

The second parameter is **time**. Primary PPH is happening in the first 24 hours post-partum mainly due to uterine atony, otherwise, it is considered a secondary PPH which is mostly associated with retained placental tissue, infections, or both.

In the recent past, most of the clinical protocols for massive hemorrhage and PPH usually considered the early use of fibrinogen as the way to go, given the fact that very low fibrinogen levels have also been identified as a risk factor for PPH, but this approach turned into a negative clinical outcome.

Thanks to the experiences with Factor XIII in surgical settings and considering that the relative or absolute loss of Factor XIII (FXIII) or non-availability of FXIII in combination with the amount of thrombin generated is significantly reduced in patients that will undergo intraoperative bleeding, the FXIII concentrates demonstrated higher efficacy in high-risk bleeding patients.

In a post-operative setting or the Intensive Care Unit (ICU), the FXIII and platelet count in addition to fibrinogen concentration is a relevant predictor of clot firmness. Fibrinogen deficiency was identified in less than 10% of the patient population, and thrombocytopenia was much more frequent, in roughly 30% of patients admitted to the ICU, in contrast, roughly 50% of patients admitted to the ICU postoperatively had **FXIII deficiency**.

The study **PPH 1300** "The impact of prepartum factor XIII activity on post-partum blood loss" was able to identify in more than 1300 patients with vaginal delivery, elective C-section, or unplanned C-section that FXIII is the biggest risk factor for the use of blood products intraoperatively.

A very high level of FXIII reduces the risk of having PPH from 2 to 3 fold as compared to a very low level of FXIII. A subgroup was constituted of patients that were less than 28 years old, had a BMI of more than 20.7, and were uniparous. In this specific subgroup, the statistical model indicated that a theoretical increase of FXIII by 50% would lead to a decrease in the prevalence of PPH by 2/3 in that particular group.

In conclusion, FXIII seems the most sensitive factor to peri-partum blood loss both overall as well as in patients with PPH. No evidence that fibrinogen has a predictable or significant influence on PPH, and in the mentioned statistical model it could be possible to reduce the PPH incidence by increasing the FXIII.

Speaker: Prof. Dr. med. Wolfgang Korte

Center for Laboratory Medicine St. Gallen
Hematology Outpatient Clinic and Hemostasis
and Hemophilia Center



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VWD Guidelines on Diagnosis and Treatment

Following the release in 2021 of the new guidelines for the treatment and diagnosis of Von Willebrand Disease (VWD) proposed by a joint committee of ISTH, ASH, and WFH, Dr. Alberto Tosetto dedicates this session to the explanation of the new guidelines highlighting treatment and diagnosis, with a special focus on women's bleeding disorders.

Introducing the three main characteristics of VWD as an inherited disorder, presence of bleeding symptoms, and VWF deficiency, Dr. Tosetto also highlights the challenges in the diagnosis of Von Willebrand Disease (VWD) patients, in particular concerning the **bleeding symptoms**, also present in the normal population, and the need to evaluate the overall number of bleeding symptoms.

From the laboratory perspective, the measurement of the **Von Willebrand Factor (VWF) levels** as a discriminator is fundamental in the diagnosis, but it needs to be combined with the presence of a very strong bleeding phenotype. To determine the patient's likelihood of VWD and discriminate the patient from the rest of the population, Dr. Tosetto introduces the concept of the **Bias Mountain**. With this approach, reaching the peak of the Bias Mountain for the diagnosis of VWD is made with a high pre-test probability, a high likelihood of being a bleeding subject, and a low VWF antigen level.

The new guidelines have been released in 2021 for the purpose of overcoming the challenges in the diagnosis and treatment of VWD. The guidelines go through the recommendations for the use of the Bleeding Assessment Tool, the definition and characterization of the VWD types and subtypes, based on VWF levels, FVIII levels, and other investigations proposed for the diagnosis of VWD.

At the same time, the guidelines highlight the importance to consider the clinical status of the patient, the concomitant diseases, or the type of surgery which the patient will undergo in order to define the appropriate prophylactic strategy or treatment.

With regards to bleeding disorders in women, the committee made some suggestions: a treatment with tranexamic acid or hormonal therapy over the use of desmopressin in case of **heavy menstrual bleeding**; an adjustment of the VWF activity level for **neuraxial anaesthesia** before delivering; the usage of tranexamic acid in post-partum even if the current main treatment for post-partum bleeding includes desmopressin or factor concentrates.

Speaker: **Dr. Alberto Tosetto**

Director of the Hemophilia and Thrombosis Center and of the Hematology Department at S. Bortolo Hospital in Vicenza



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Risk Factor for Thrombosis in Pregnancy

Following thProf. Elvira Grandone's session discusses the risk factors for thrombosis in pregnancy and in the post-partum period.

The first aspects to be taken into consideration are the hemostatic changes occurring during pregnancy with an increase of factors levels responsible for the **prothrombotic state** and at the same time a decrease in protein S. This effect is even more evident with the progression of the pregnancy in which parameters like D-Dimer, fibrinogen, and platelets increase during the different trimesters. These hemostatic changes also increase the risk of venous thrombosis.

A second point to be taken into consideration is the use of **contraceptives** that increase the risk of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) during the childbearing age. Similarly, Venous Thrombo Embolism (VTE) risk increases during pregnancy in the second trimester through to the delivery and this is the period in which particular attention has to be given to the diagnosis of VTE. As also confirmed by the epidemiological data, hemorrhage, and thromboembolism continue to be major causes of maternal death in high-income countries.

There are also individual risk factors and circumstantial risk factors to be considered.

The aging of the pregnant women population is increasing the usage of **reproductive techniques** and both in successful and unsuccessful pregnancies the risk of VTE is significantly higher than in pregnancy following natural conception. An additional point worth sharing is that **cesarean section** on its own has an increased risk of DVT or VTE both in high and low-income countries.

Another risk factor is the concomitant presence of other hemostatic defects. Both bleeding and thrombophilia conditions carry a higher risk during pregnancy and in the post-partum period.

Even if the most frequent cause of PPH is uterine atony, the second main cause is an increase in **fibrinolytic activity**, which paradoxically can induce the down-regulation of the anticoagulant factors and therefore transform into a condition that increases the thrombotic risk after delivery and in the early puerperium.

Another circumstantial risk factor to watch out for is the risk of PE stemming from the transfusion of blood components. To conclude, a **risk assessment** before the hospitalization is fundamental, but it's as well fundamental to repeat the risk assessment after the delivery taking into consideration circumstantial and individual risk factors.

Speaker: **Prof. Elvira Grandone**

Associate Professor of Obstetrics and Gynecology at University of Foggia
Head of Thrombosis and Hemostasis unit at Research Institute
"Casa Sollievo della Sofferenza", S. Giovanni Rotondo



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DIC and COVID-19 Coagulopathy in Pregnancy

Prof. Offer Erez highlights in this session the pressing issue to reduce the maternal mortality caused by obstetrical hemorrhage due to Disseminated Intravascular Coagulation (DIC) with a particular focus on COVID-19 coagulopathy in pregnancy. He identifies several points that require attention like the gap in education, the awareness of the prevalence of the disease, the introduction of treatment modalities, interdisciplinary communication, and the creation of a regional network of support.

Prof. Erez explains that during pregnancy in cases that are complicated with hemorrhage, there is also a concomitant increase in **thrombin generation**. Of particular attention is when the patient's fibrinogen in the mother loses its ability to function properly or there is a low quantity, the balance between anticoagulants and procoagulants is lost and we can start seeing the following: thrombocytopenia, hypofibrinogenemia, prolongation of general coagulation tests and a consumption coagulopathy that, if not treated, leads to DIC.

As long as the thrombin generation is compensated, the patient is under non-overt DIC, but when it becomes de-compensated there is concomitant hyperfibrinolysis leading to hemorrhage or thrombosis leading to organ failure.

The diagnosis of DIC is always secondary to the patient clinical condition and is essential to look at the underlying causes of the DIC to treat them. The most prevalent causes of DIC are peri-partum hemorrhage and placental abruption in which the discharge of trophoblast debris and carrying active tissue factor into the maternal circulation cause systemic generation of thrombin and fast consumption of coagulation factors. For women with **HELLP** (Hemolysis, Elevated Liver enzymes, and Low Platelets) **syndrome** and DIC there is a higher rate of acute renal failure, eclampsia, maternal mortality, and placental abruption.

In the case of coagulopathy associated with **COVID-19** in pregnancy, there is increased fibrin deposition, increased vasculopathy, and concomitantly inflammatory lesions in the same proportion of the vascular and inflammatory lesion, suggesting that both activations of inflammation and activation of coagulation occur in the placental bed. This has a tremendous impact on pregnancy.

The take-home message is that DIC is a problem that can be **preventable in 75-80% of the cases** if there is the right recognition of signs of hemorrhage if the proper laboratory testing is used, and if there is correct understanding of the results. This allows the clinicians to be on top of the patient, preventing the disease and correctly assisting the women during pregnancy.

Speaker: **Prof. Offer Erez**

Professor and Chairman of Department of Obstetrics
and Gynecology Emek Medical Center



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Implementation of Goal-Directed Bleeding Management in Post-Partum Hemorrhage (PPH)

During this session, Dr. Sarah Bell provides her insights and experience on the implementation of goal-directed bleeding management in post-partum hemorrhage. She begins by explaining that post-partum hemorrhage is typically caused by the 4T's: uterine atony, tissue trauma, retained tissue, and clotting abnormalities. However, Dr. Bell suggests rebranding the 4T's to the 3T's and an F, with the F representing **fibrinogen**, which increases during pregnancy. Low fibrinogen levels can contribute to post-partum hemorrhage, and treating patients with fibrinogen concentrate may improve outcomes. Nevertheless, recent studies have shown that providing empirical fibrinogen concentrate to patients with post-partum hemorrhage made no significant difference in outcomes. Furthermore, waiting for laboratory results for the appropriate transfusion ratios can prolong the management of post-partum hemorrhage.

To address this challenge, Dr. Sarah Bell discusses the search for bedside tests of coagulation that can provide information on the contribution of fibrinogen to clot strength. This search has led to an interest in **ROTEM**, which provides results in 10-15 minutes. In the OBS Plus study conducted in Cardiff, the goal was to determine how to incorporate **viscoelastic testing** into clinical practice and how the FIBTEM test can help identify hypofibrinogenemia in post-partum hemorrhage. The study found a moderate linear correlation between the FIBTEM A5 and fibrinogen levels. However, Dr. Bell emphasizes the importance of using the FIBTEM test within an algorithm that uses clinical acumen to decide whether to administer fibrinogen based on the test results. The study also found that very little fresh frozen plasma (FFP) was used, indicating that empirical transfusion ratios would have led to more FFP transfusions.

In conclusion, Dr. Sarah Bell's experience and insights demonstrate that utilizing ROTEM and the FIBTEM test to detect hypofibrinogenemia may offer valuable information for the management of post-partum hemorrhage. Clinical judgment should be used to determine when to provide fibrinogen concentrate, and empirical transfusion ratios may result in increased FFP transfusions.

Speaker: **Dr. Sarah F. Bell - MBBS**

Consultant Anesthetist Intensive Care
and Pain Medicine Cardi and Vale University



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Viscoelastic testing guided bleeding management for PPH: the United Arab Emirates approach

Dr. Tarek Ansari's presentation draws on his extensive experience in the United Arab Emirates to discuss the optimal use of viscoelastic testing-driven, goal-directed bleeding management over traditional approaches such as massive transfusion protocols (MTP) and conventional coagulation tests (CCT) in the hemostatic management of bleeding patients in obstetrics.

MTP involves replacing blood loss with a balanced ratio of blood and blood components, such as one unit of blood, one unit of plasma, and one unit of platelets, which results in an excessive amount of blood transfused, that has been linked to severe adverse outcomes like a multi-organ failure and transfusion-related acute lung injury.

Moreover, several studies indicate that in post-partum hemorrhage, **fibrinogen** is one of the first coagulation factors to get lower. Therefore, in obstetric patients experiencing massive bleeding with fibrinogen loss, three options are commonly considered to replace fibrinogen levels: fresh frozen plasma (FFP), cryoprecipitate, and fibrinogen concentrate. However, the challenge with **FFP**, apart from the time needed to receive it from the blood bank (taking at least 40 minutes from the decision to transfusion), is the low levels of fibrinogen concentration, which may not be sufficient to treat a fibrinogen deficiency. Considering the waiting time, the below requirement fibrinogen concentration, and the potential hazards associated – like transfusion-associated circulatory overload, or transfusion-associated acute lung injury – FFP is not anymore considered the right choice in fibrinogen substitution.

Dr. Ansari suggests a more personalized approach to fix hypofibrinogenemia, which minimizes the use of FFP to reduce the risk of adverse outcomes while accurately replacing fibrinogen levels.

To achieve this, Dr. Ansari highlights the importance of **point-of-care viscoelastic testing**, such as ROTEM, which allows for real-time monitoring of coagulation and clot initiation, strength, and stability. In contrast, conventional coagulation testing has limitations as it measures coagulation in a static state. The introduction of the ROTEM Gamma machine in his institution in 2008 has revolutionized the approach towards goal-directed bleeding management.

Dr. Ansari concludes by emphasizing the significance of goal-directed hemostatic therapy in cases of massive obstetric hemorrhage, where the administration of fibrinogen or cryoprecipitate guided by viscoelastic hemostatic assays can significantly reduce the use of blood and blood products, leading to improved patient outcomes.

Speaker: **Dr. Tarek Ansari**

Acting Deputy Chief Medical Officer
Department of Anesthesia - CMO - Corniche Hospital
Abu Dhabi, UAE



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Goal-directed hemostatic therapy in Obstetric hemorrhage: case discussions

In her presentation, Dr. Fatma Khatoon shares her insights on managing obstetric hemorrhage, and she begins by expressing her concerns about the use of **Massive Transfusion Protocols** (MTPs) in obstetrics. Dr. Khatoon highlights that the guidelines for MTPs are based on data collected from war patients and may not be transferable to pregnant women. She believes that formula therapy, which employs a predefined ratio of blood and blood products, can lead to unnecessary and potentially hazardous transfusions and lacks a clear endpoint. In her opinion, MTPs do not differentiate between the underlying cause of bleeding and treat all patients with equivalent blood loss similarly. As a result, she advocates for a more customized and goal-oriented approach to hemostatic therapy that is based on patient-specific factors and real-time monitoring.

Dr. Khatoon emphasizes that integrating viscoelastic devices in clinical practice offers a more precise **assessment of coagulation status in real-time** during massive obstetric bleeding, compared to conventional laboratory tests that may not be as effective in guiding hemostatic therapy. In the experience from her institution, while there was initially some reluctance among clinicians to move away from traditional practices, constant exposure towards a more goal-directed approach gradually led to the widespread adoption of viscoelastic testing devices through an algorithm to guide decision-making in post-partum hemorrhage. The benefits of using these devices have become increasingly apparent, involving reduced complication rates and cost savings, leading to their use in clinical practice beyond obstetrics.

During her presentation, Dr. Khatoon also highlights the importance of coordination between different specialists of healthcare professionals, including obstetric anesthesiologists, obstetric surgeons, nurses, and blood bank staff. This alignment in patient care, especially during emergency situations, allows healthcare providers to focus on the patient's care and is an essential part of a goal-directed approach.

Additionally, Dr. Khatoon shares some **clinical cases** of post-partum hemorrhage from her experience, including a case of amniotic fluid embolism, which is one of the most severe conditions associated with severe coagulopathy, complications, and outcomes. Using these cases, she demonstrates how implementing viscoelastic testing for goal-directed bleeding management in post-partum hemorrhage can result in the early detection of coagulopathy, leading to faster diagnosis, decision-making, and treatment. This approach reduces complications and improves outcomes for patients.

Speaker: Dr. Fatima Khatoon, MD

Department of Anaesthesia and Intensive care -
Hamad Medical Corporation - Doha, Qatar



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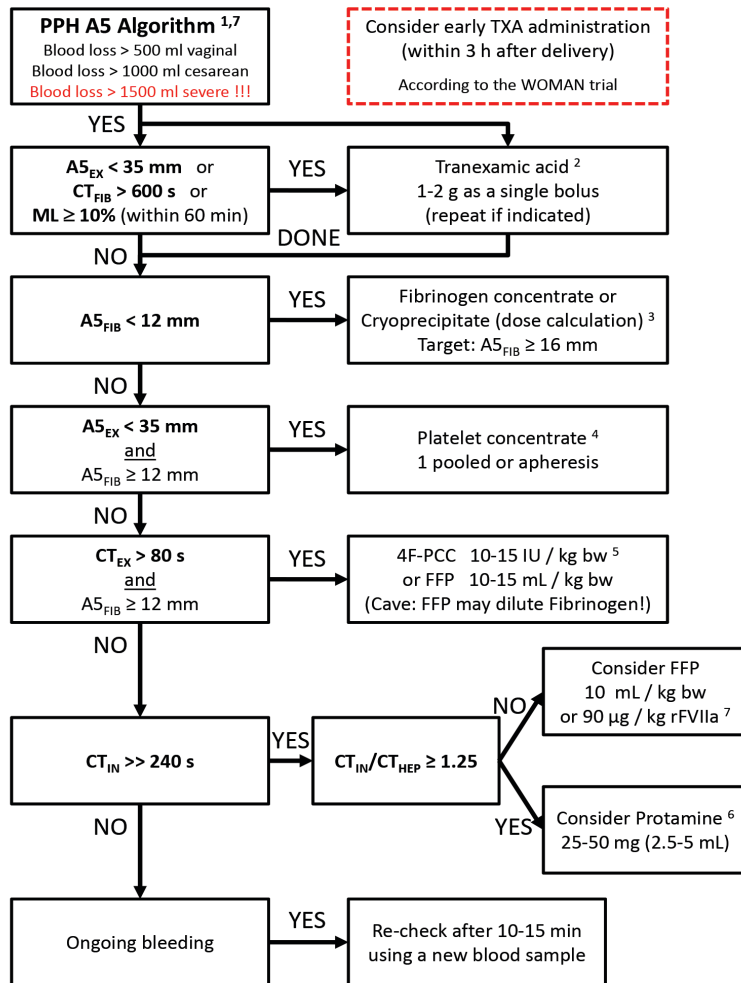
The role of evidence-based algorithms for rotational thromboelastometry-guided bleeding management

As noted in multiple sessions, uterine atony and placental complications are the leading causes of Post-Partum Hemorrhage (PPH). Hemostatic interventions, such as plasma or platelet transfusion and coagulation factor concentrates, should only be utilized in cases of coagulopathy. The ISTH Scientific Subcommittees on Women's Health Issues in Thrombosis and Hemostasis and on disseminated intravascular coagulation (DIC) recommend against pre-emptive use of fibrinogen concentrate and suggest that FFP is not required if POC or laboratory tests of hemostasis are normal. However, severe bleeding can ultimately result in coagulopathy, rendering the management of PPH a challenge.

Viscoelastic testing, specifically ROTEM-guided bleeding management, aids in the management of PPH by implementing the concept of personalized or precision medicine through evidence-based, algorithmic approaches for obstetrics patients, which identify and exclude coagulopathies as potential sources of bleeding.

Hyperfibrinolysis can cause bleeding, especially in PPH with severe shock or in patients with amniotic fluid embolism, and early administration of tranexamic acid (within three hours of labor) is recommended based on the WOMAN trial. Rapid changes in plasma fibrinogen concentration and fibrin polymerization (FIBTEM) are crucial factors in the development and progression of severe PPH. Impaired thrombin generation rarely occurs in PPH but may happen due to ongoing bleeding and dilution or in cases of acquired hemophilia.

As precision individualized medicine becomes more accepted as best practice in traumatic and post-partum hemorrhage, ROTEM-guided management of coagulopathy is recommended in several national and international guidelines. Some authors have even suggested that coagulation POC testing should be mandatory in the labor ward.



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Multi-Disciplinary Joint Session on Bleeding and Thrombotic Disorders in Women

Our journey with Bleeding and Thrombotic Disorders in Women awareness wrapped up with the multi-disciplinary joint session at the EEMEA Scientific Seminars in Budapest (Hungary) in October of 2022. The speakers of the launch session were invited to this final meeting which took place as a conclusion of the 13th Advanced Hemostasis Seminar, the 2nd EEMEA Acute Care Experts Meeting, and the opening session of the 9th International Autoimmunity Seminar.

Prof. Elvira Grandone moderated the discussion and the Q&A session, adding to the talk her expertise and knowledge as Associate Professor of Obstetrics and Gynaecology at the University of Foggia.

Naja Skouw-Rasmussen started the session by sharing her story as a patient who experienced heavy bleeding symptoms. After many years of bad experiences, and varied effectiveness of treatments, she finally found a treatment that worked for her and provided a good quality of life. Through her story, Dr. Skouw-Rasmussen highlighted the importance of accurate diagnosis and appropriate treatment for women with bleeding disorders and reducing the gap of 16 years in the diagnosis of hemorrhagic disorders between men and women.

Prof. Savino Sciascia discussed in the second part of the joint session the thrombotic disorder associated with the antiphospholipid syndrome [APS]. The challenge is to identify which thrombotic or pregnancy-related conditions may be related to APS, as a misdiagnosis may lead to ineffective treatment. The current diagnostic criteria are limited and there is a need for better risk stratification tools. He urged the audience that antiphospholipid antibodies should be used as a risk factor, and not just as a biomarker so that testing can be implemented before severe complications occur. There is room for improvement in both the diagnosis and management of the condition.

The last speaker to take the stage was Dr. Klaus Görlinger, Medical Director for Patient Blood Management in Werfen, to discuss the value of viscoelastic testing in post-partum hemorrhage [PPH], emphasizing the importance of identifying a coagulopathy in PPH, which increases the odds of massive transfusion and the risk of hysterectomy, as well as the significant morbidity associated with transfusion.

While the standard coagulation tests recognize a coagulopathy in a small number of cases, the use of viscoelastic testing can increase the incidence, allowing for the identification of situations that cannot be detected by standard tests. Dr. Görlinger highlighted the three fundamental aspects to improve patient care: to measure, to improve the management, and to monitor the patient outcome.

Speakers: **Prof. Elvira Grandone**

Associate Professor of Obstetrics and Gynecology at University of Foggia
Head of Thrombosis and Hemostasis unit at Research Institute
"Casa Sollievo della Sofferenza", S. Giovanni Rotondo

Naja Skouw-Rasmussen

Patient with bleeding disorder
Think Tank Officer at European Hemophilia Consortium Think Tank

Prof. Savino Sciascia

Associate Professor and Researcher at the Center of Research
of Immunopathology and Rare Disease at University of Turin

Dr. Klaus Görlinger

Medical Director for Patient Blood Management in Werfen
Senior Consultant for Anaesthesiology, Emergency and
Intensive Care Medicine, Hemostesiology, and Pain Therapy

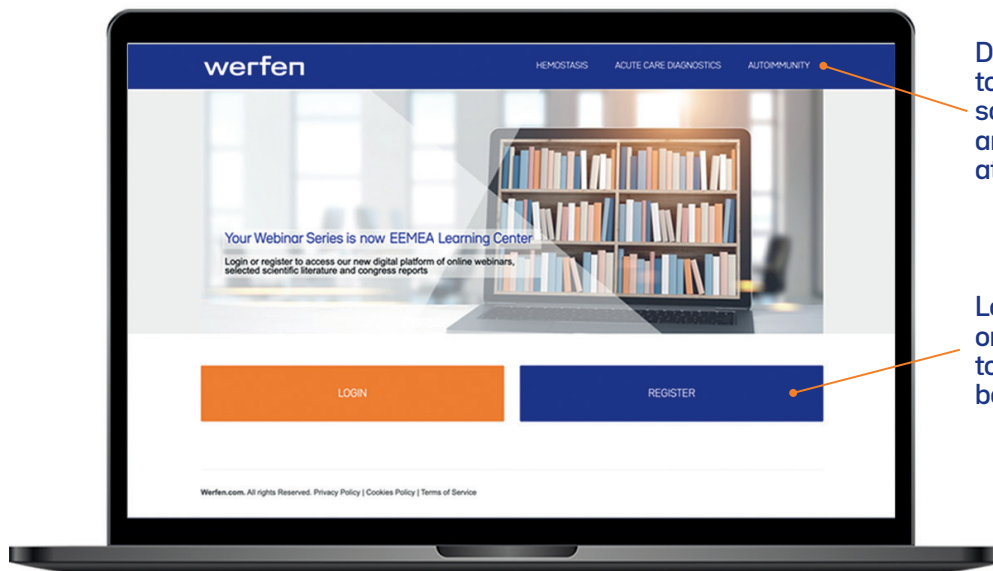


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