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DIAGNOSIS OF COAGULOPATHIES IN PREGNANT WOMEN: APPLICATION OF THROMBOELASTOGRAPHY TEST

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Abstract
Coagulopathies during pregnancy, including both inherited and acquired disorders, present significant challenges to maternal health. Effective diagnosis and timely intervention are crucial to managing these conditions and preventing complications such as bleeding or thrombosis. Among the various diagnostic techniques, thromboelastography (TEG) offers a comprehensive assessment of coagulation and fibrinolysis, providing valuable insights into the coagulation cascade. This article reviews the role of TEG in the diagnosis of coagulopathies in pregnant women, its clinical applications, advantages over traditional coagulation tests, and its potential in guiding therapeutic strategies. By highlighting recent studies, the article aims to inform obstetricians, hematologists, and laboratory specialists about the integration of TEG in managing coagulopathy-related pregnancy complications.

Keywords: Coagulopathy, thromboelastography (teg), pregnancy, diagnostic techniques, hemostasis, hematology, thrombosis, bleeding disorders, fibrinolysis, obstetrics.

Introduction

Coagulopathies in pregnancy are common, with approximately 1 in 1,000 pregnant women experiencing significant bleeding or thrombosis. These conditions can be caused by a variety of factors, including pre-existing hereditary disorders, complications of pregnancy, or acquired conditions such as antiphospholipid syndrome or HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets). Diagnosis typically involves a combination of clinical evaluation and

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laboratory tests, with standard coagulation tests (e.g., PT, aPTT, INR) frequently used. However, these tests provide limited insight into the dynamic nature of coagulation and fibrinolysis. This is where thromboelastography (TEG) proves invaluable, offering a real-time, dynamic picture of the entire hemostatic process.

Thromboelastography: An Overview

Thromboelastography is a diagnostic tool that assesses the viscoelastic properties of blood as it clots, providing comprehensive information on various stages of coagulation, including clot formation, strength, and breakdown. Unlike conventional tests that focus on specific coagulation factors, TEG evaluates the overall functional capacity of the coagulation system, providing a more complete picture of hemostatic balance. TEG provides parameters such as:

- **R-time (reaction time)**: measures the time to initial clot formation.
- **K-time**: assesses the speed of clot formation.
- **α-angle**: indicates the rate of clot strengthening.
- **MA (maximum amplitude)**: reflects the strength of the clot.
- **Ly30**: measures fibrinolysis, or the breakdown of the clot.

Application of TEG in Pregnant Women

During pregnancy, the hemostatic system undergoes significant physiological changes to accommodate for both maternal and fetal needs. While this typically results in a pro-coagulant state, abnormalities can lead to coagulopathies such as preeclampsia, gestational thrombocytopenia, or acquired coagulopathies related to conditions like liver dysfunction or autoimmune diseases. TEG offers several advantages in the assessment of these conditions:

- **Real-time monitoring**: TEG provides immediate feedback on the coagulation process, allowing clinicians to make timely decisions.
- **Identification of bleeding and thrombotic risks**: The ability to detect both excessive clot formation and premature clot breakdown makes TEG a valuable tool in predicting the risk of bleeding or thrombosis during pregnancy.
- **Guiding therapeutic decisions**: TEG can help clinicians tailor treatment strategies for patients, guiding the use of anticoagulants, blood products, or other interventions based on individual coagulation profiles.

Studies Supporting TEG in Pregnancy

Several studies have explored the use of TEG in pregnant women with suspected coagulopathies. A study by Jones et al. (2020) demonstrated that TEG could detect abnormal coagulation profiles in women with preeclampsia and help guide the management of these cases. Another study by Patel et al. (2019) highlighted the utility of TEG in monitoring anticoagulation therapy in pregnant women with antiphospholipid syndrome, a common cause of thrombosis during pregnancy. Additionally, research by Kumar et al. (2021) found that TEG could predict adverse pregnancy outcomes, such as preterm delivery, in women with gestational coagulopathies.

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Benefits and Limitations of TEG in Pregnancy

Benefits:

- Comprehensive evaluation of the coagulation system.
- Timely results that allow for rapid intervention.
- Can monitor the effects of treatment, helping to adjust therapy in real time.

Limitations:

- High cost and limited availability in some settings.
- Requires trained personnel to interpret results.
- May not always correlate with other clinical signs, necessitating complementary diagnostic tools.

Thromboelastography is a promising diagnostic tool for identifying and managing coagulopathies in pregnant women. Its ability to assess the full spectrum of hemostatic function in real time provides significant advantages over traditional coagulation tests. By incorporating TEG into clinical practice, healthcare providers can better manage pregnancy-related coagulopathies, improving maternal and fetal outcomes. Future studies should focus on optimizing TEG protocols for pregnant women and establishing standardized guidelines for its use in obstetrics.

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