



# Clinical Interpretation of Blood Indices in Autoimmune Pregnancy Disorders

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## DESCRIPTION

Obstetric Antiphospholipid Syndrome (OAPS) represents a significant challenge for maternal-fetal health due to its effects on placental function, vascular stability and coagulation balance. Women with this condition experience recurrent pregnancy loss, preeclampsia, placental insufficiency and growth restriction. These complications arise from the combined influence of antiphospholipid antibodies and coagulation disturbances, both of which damage placental blood flow and vascular integrity. As the clinical presentation varies widely among individuals, accurate diagnostic evaluation is essential. Blood coagulation indices have gained increasing attention because they provide measurable insight into coagulation activity and reflect the hidden interplay between immune responses and thrombosis. Their diagnostic value becomes especially relevant when clinicians aim to distinguish OAPS from normal pregnancy changes or separate its subtypes.

### Coagulation assessment in pregnancy

Pregnancy itself induces a natural shift toward a pro-coagulant state as a protective mechanism against excessive bleeding during childbirth. This physiological shift includes elevated fibrinogen levels, increased clot strength and a rise in certain clotting factors. However, when antiphospholipid antibodies are present, the coagulation system becomes further activated, often in unpredictable ways.

Distinguishing normal pregnancy changes from pathological patterns is difficult with routine clinical evaluation alone. Coagulation indices provide access to a measurable and objective representation of clotting activity. They allow clinicians to recognize when the coagulation system crosses the threshold from physiological adaptation to harmful activation. When applied correctly, these indices support early detection of OAPS, assessment of disease severity and monitoring throughout gestation.

### Coagulation patterns in OAPS

Women with OAPS frequently display abnormalities that indicate increased thrombin generation and stable clot formation. These include elevated fibrinogen, increased D-dimer, shortened Thromboelastography (TEG) initiation times and strong clot firmness. The presence of antiphospholipid antibodies enhances tissue factor expression on endothelial cells and monocytes, accelerating the extrinsic pathway. This results in enhanced thrombin production and persistent clot deposition.

A prolonged coagulation time may appear in women who test positive for Lupus Anticoagulant (LA). Although paradoxical, this prolongation is not associated with bleeding. Instead, it signals interference with phospholipid-dependent reactions. Similarly, high D-dimer levels indicate active fibrin turnover, reflecting the continuous formation and breakdown of microthrombi in the placenta.

### Diagnostic differences

Each subtype of OAPS presents distinct coagulation characteristics. Lupus anticoagulant-positive individuals often exhibit the most notable prolongation of aPTT and show significant alterations in TEG parameters, such as increased clot strength and reduced clot breakdown. This subtype is strongly associated with early pregnancy loss and severe placental dysfunction.

Triple-positive individuals present the most pronounced coagulation abnormalities. High D-dimer, elevated fibrinogen and strong clot strength on TEG are common. These women face the highest risk for pregnancy loss and require close monitoring. Coagulation indices provide valuable insight into the degree of coagulation activation in this group.

### Interpretation of Coagulation Indices

While pregnancy naturally affects coagulation, OAPS produces changes that exceed physiological limits. Healthy pregnant individuals often show moderate increases in fibrinogen and D-

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dimer, but values in OAPS rise earlier and more sharply. Abnormalities in TEG or Thrombin Generation Test (TGT) also appear sooner and are more pronounced.

Interpreting coagulation indices requires understanding normal pregnancy trends. For example, an elevated D-dimer late in pregnancy may be physiological, but extremely high levels early in gestation may indicate OAPS. Similarly, shortened clot initiation times and strong clot firmness on TEG suggest excessive coagulation activity beyond what is expected in pregnancy.

### Monitoring coagulation changes

Monitoring coagulation indices throughout pregnancy provides valuable information for adjusting treatment. Low-dose aspirin and heparin therapy are common interventions for OAPS and coagulation indices help guide dosage and frequency. For example, a sudden rise in D-dimer or a significant shift in TEG parameters may indicate the need for intensifying therapy or enhancing fetal surveillance.

Coagulation monitoring also aids in predicting adverse outcomes such as placental insufficiency, early fetal loss, preeclampsia, or postpartum thrombosis. Regular evaluation allows clinicians to anticipate complications and intervene before significant damage occurs.

### Integrating coagulation indices

Blood coagulation indices should not replace antibody testing but should function as complementary tools. Antibody profiles confirm the immunological diagnosis, while coagulation indices reveal the functional consequences of these antibodies. When used together, these methods create a more complete and reliable diagnostic pathway.

Integrating both approaches supports early diagnosis, accurate subtype classification and optimal treatment planning. It also enhances clinical understanding of how antibody activity directly influences clot dynamics throughout pregnancy.