Fibrinogen is an acute phase protein (APP). It is used clinically as an indicator of systemic inflammation, both acute and chronic. Early recognition of systemic inflammation is essential to formulate and initiate an effective treatment plan. Inflammation which is not recognized or is subclinical impairs growth and performance. Acute phase proteins are quickly released into the bloodstream in response to inflammation or injury. Their blood levels are directly related to the severity of the underlying condition. By definition, APP’s are those proteins in which plasma concentrations increase or decrease by at least 25% after an inflammatory stimulus.
Fibrinogen - Its Use in Equine Medicine

The most frequently measured APP’s in equine medicine include fibrinogen, serum amyloid A and haptoglobin. APP’s are also classified as positive (increasing during inflammation) or negative (decreasing during inflammation). Albumin is the negative APP in most species because it is down-regulated in favor of increased hepatic synthesis of positive APP’s. Fibrinogen is commonly used as the positive APP in equine medicine because of these factors:

1. Always present in plasma of healthy horses, with consistent baseline values,
2. Plasma concentration increases up to 10X in response to inflammation or injury within 24-72 hours,
3. Return to baseline occurs within 1-2 weeks after the inflammatory process ceases.

Plasma fibrinogen T1/2 is approximately 3 days. Fibrinogen is a soluble glycoprotein synthesized by the liver. It is used to diagnose and monitor a variety of inflammatory conditions in the horse. Increased fibrinogen concentration is associated with a wide variety of inflammatory diseases and may be the only indicator of inflammation if the accompanying leukogram is normal.

Plasma fibrinogen may also be increased with dehydration and may be decreased with severe hepatic disease because of decreased production. In cases of DIC, fibrinogen may be decreased due to increased utilization (masking the hyperfibrinogenemia associated with the inflammatory process).

If the ratio is between 10-15, clinical impression and other diagnostic aids should be utilized to determine if the ratio is significant. Ratios <10 are abnormal and support active inflammation.

The degree of hyperfibrinogenemia approximates the severity of disease and can be used, in conjunction with the clinical findings and other laboratory data, for determining a treatment protocol and possibly prognosis for the primary disease process. Along with a CBC, serial fibrinogen concentrations may be useful in determining treatment efficacy. Fibrinogen levels may be used alone in determining resolution of the inflammatory process when the leukogram is unchanged or has returned to normal.

Normal Hyperfibrinogenemia

There are certain situations when hyperfibrinogenemia is normal in the horse. Fibrinogen may be increased in foals up to 6 months of age and during pregnancy in mares. In foals, fibrinogen can exceed normal adult levels and may be attributed to maturing hepatic function and not associated with subclinical disease.
PLASMA PROTEIN: FIBRINOGEN (PP:F) RATIO

Useful in the interpretation of fibrinogen concentration when hyperproteinemia is present. This ratio is calculated as:

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PP:F \text{ ratio } = \frac{\text{plasma TP mg/dl} - \text{fibrinogen mg/dl}}{\text{fibrinogen mg/dl}}
\]

Normal = 15-20
Dehydration = >20
Inflammation = <15

In one study, fibrinogen concentration increased (>40%) in prepartum mares. These levels can further increase 10% in the immediate post-partum period, returning to normal by day 14 after foaling.

Clearly, measuring fibrinogen concentrations should be included when performing a CBC in the horse. Fibrinogen may be the only indicator of inflammation in the subclinical horse when the leukogram is within normal limits. Fibrinogen also provides information regarding treatment efficacy, prognosis and length of treatment, especially considering such conditions as strangles, pigeon fever, pleuropneumonia, omphalophlebitis, septic arthritis, endometritis, clostridial myonecrosis, cellulitis, and endocarditis, to list a few.

References:
