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Serum Free Light Chains Assay

Contact:

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Mnemonics: **Kappa/Lambda Group (Test Code 3500150)**
Free Lambda (Test Code 3500170)
Free Kappa (Test Code 3500160)

(Tests may be ordered as a **Kappa/Lambda Group** which includes the Free Kappa, Free Lambda light chains and a Kappa/Lambda ratio or as individual **Free Kappa** or **Free Lambda** light chains).

Performed: Monday through Friday (Days)

Specimens:
Use fresh or deep frozen serum samples. Serum should be obtained by venipuncture, allowed to clot and the serum separated as soon as possible to prevent hemolysis. Samples may be stored at 2-8°C for up to 21 days. For prolonged storage, the specimens should be kept frozen at -20°C or below. Repeated freeze/thaw cycles should be avoided.

Summary:
CPAL is pleased to announce that beginning June 6, 2011; we will be performing quantitative immunoassays for the detection of free immunoglobulin light chains in serum. The Freelite™ assay is a turbidimetric immunoassay test that detects only free kappa and free lambda light chains (those not bound in intact immunoglobulin). Its clinical uses are:

A. **Diagnosis of monoclonal gammopathy** in conjunction with serum protein electrophoresis or serum immunofixation: the International Myeloma Working Group recommends serum free light chain analysis as part of the initial screening panel for patients with suspected monoclonal gammopathy. It replaces urine sampling for all gammopathies except suspected AL amyloidosis for which urine is still required.

B. **Monitoring response to treatment and for relapse** in patients with myeloma and other plasma cell dyscrasias

C. **Assessment of risk of progression in patients with monoclonal gammopathy of undetermined significance (MGUS):** an abnormal κ:λ ratio is present in one third of patients with MGUS, and is associated with an increased risk of progression to multiple myeloma and other plasma cell dyscrasias

Normal ranges

Serum kappa (κ) concentration: 3.3–19.4 mg/L
Serum lambda (λ) concentration: 5.7–26.3 mg/L
Serum κ/λ ratio: 0.26-1.65

This assay has not been validated for the pediatric population.

Interpretation

	Kappa	Lambda	κ:λ Ratio
Normal	3.3–19.4 mg/L	5.7–26.3 mg/L	0.26–1.65
Monoclonal kappa	Increased	Normal or decreased	Increased
Monoclonal lambda	Normal or decreased	Increased	Decreased
Biclonal kappa and lambda expansion	Increased	Increased	Normal or abnormal*
Renal impairment	Increased	Increased	Normal†
Polyclonal gammopathy	Increased	Increased	Normal
Bone marrow suppression	Decreased	Decreased	Normal

*Dependent on relative concentrations of kappa versus lambda
†Ratio may increase to 3.1 due to reduced renal clearance

Background

Measurement of serum levels of free kappa and free lambda and their ratio can be used to diagnose and monitor patients with abnormally increased production of monoclonal free light chains, such as those with multiple myeloma (including light chain myeloma and oligosecretory myeloma), light chain deposition disease, and AL amyloidosis. Approximately one third of patients with monoclonal gammopathy of undetermined significance (MGUS)

have an abnormal kappa/lambda ratio, indicating an increased risk of progression to multiple myeloma or other plasma cell dyscrasias.

Serum protein electrophoresis (SPEP) has a sensitivity of approximately 80–87% for the detection of paraproteins. Measurement of serum free light chain concentrations in combination with SPEP or serum immunofixation increases diagnostic sensitivity to approximately 97–99%. The International Myeloma Working Group recommends serum free light chain analysis as part of the initial screening panel for patients with suspected monoclonal gammopathy.

Urine protein electrophoresis or urine immunofixation has been traditionally used for detection of Bence Jones proteins (free light chains in the urine). Only when free light chain production exceeds the resorptive capacity of the kidney will free light chains spill into the urine. Thus, increases in clonal free light chain concentrations appear earlier in the serum, and are a more sensitive indicator of light chain disease than urine assays. With renal impairment, clearance of free light chains is slowed, thereby causing increased serum concentrations of both kappa and lambda.

The serum half-life of free kappa and free lambda is less than 6 hours. In comparison, the half-life of IgG is approximately 20–25 days. Thus, when assessing response to chemotherapy, the free light chain assays may provide a virtual real-time assessment of tumor kill.

Limitations

Test results alone are not diagnostic. Results should be used in conjunction with other tests and clinical findings for final diagnosis.

References

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