Cardio IQ® ST2, Soluble

Test Code: 91823(X)

Specimen Requirements: 1 mL refrigerated serum (red-top [no gel] preferred); 0.5 mL minimum

CPT Code*: 83006

CLINICAL USE

- Assess risk of progression in patients with acute and chronic heart failure

CLINICAL BACKGROUND

Accurate risk assessment is important for determining appropriate management for patients with acute and chronic heart failure. B-type natriuretic peptide (BNP) and N-terminal proBNP (NT-proBNP) are the most commonly used biomarkers for heart failure diagnosis and risk stratification; however, both have a "gray zone" in which the diagnostic accuracy is limited.[1] When levels are in the gray zone, other conditions should be considered; these include pulmonary hypertension, acute coronary syndrome, atrial fibrillation, and chronic obstructive pulmonary disease.[1] In addition, BNP and NT-proBNP levels are dependent on factors such as age, sex, body mass index (BMI), and renal and liver function, which can complicate interpretation of results.[1-3]

Another biomarker for heart failure is ST2, an interleukin-1 family receptor expressed in cardiomyocytes. ST2 exists in 2 forms: transmembrane bound and soluble (ie, circulating; sST2).[4,5] Interleukin-33 (IL-33) is the ligand for both isoforms, and binding of IL-33 to transmembrane-bound form of ST2 exerts a protective antihypertrophic, antifibrotic effect on cardiomyocytes.[4,5] sST2 binds and removes IL-33 from the circulation, thus decreasing activation of transmembrane ST2 and potentially promoting adverse remodeling and fibrosis.[4,5]

sST2 is elevated in heart failure, inflammatory disease, and other forms of heart disease.[6] As a biomarker, sST2 lacks sufficient specificity for diagnosis but is useful for assessing prognosis in heart failure.

The American College of Cardiology Foundation/American Heart Association guidelines recommend measurement of sST2 for additive risk stratification in patients with acute or chronic heart failure.[7] High sST2 levels are associated with an increased risk for heart failure progression, heart transplantation, and death.[8,9] These risks are independent of traditional and biochemical risk factors, including age, BMI, renal function, and NT-proBNP levels.[8-10]

The International ST2 Consensus Panel reviewed current literature and evaluated conditions in which sST2 testing has additive value for prognosis. Their recommendations are summarized in the **Table**.

Using both sST2 and NT-proBNP can improve risk stratification of patients with acute and chronic heart failure: High levels of both sST2 and NT-proBNP, compared with high levels of only one, better predict heart failure progression, hospital readmission, heart transplantation, and death.[15,16] Elevated levels of both sST2 and NT-proBNP also predict worse outcomes in patients with ST-elevation myocardial infarction.[17]

Table. The International ST2 Consensus Panel Recommendations for ST2 Testing in Heart Disease

Indication	Recommendation
Acutely decompensated heart failure[11]	Measure sST2 at baseline and posttreatment
Acute heart failure (hospitalized patients)[12]	Measure sST2 at hospital admission and again at discharge.
Chronic heart failure (monitoring therapy)[13]	Measure serially to maximize prognostic value (eg, baseline, 3 to 6 months, and 12 months)
Stable and unstable ischemic heart diseases (patients with undifferentiated chest pain, STEMI, NSTEMI, and chronic stable CAD)[14]	Measure sST2 ≤24h after presentation

sST2, soluble ST2; CAD, coronary artery disease; STEMI, ST-elevation myocardial infarction; NSTEMI; non-STEMI.

The Cardio IQ® ST2, Soluble test measures sST2 concentration, while the Cardio IQ® NT ProBNP test (test code 91739) measures NT-proBNP concentration. These tests can be used in risk assessment of patients with acute and chronic heart failure.

INDIVIDUALS SUITABLE FOR TESTING

- Individuals with acute or chronic heart failure

METHOD

- Enzyme-linked immunosorbent assay (ELISA) using 2 monoclonal ST2 antibodies
- Analytical measurement range: 3 to 200 ng/mL

REFERENCE RANGE

≤35 ng/mL

INTERPRETIVE INFORMATION

Patients with heart failure who have sST2 levels above the reference range have a worse prognosis and are at increased risk for heart failure progression, rehospitalization, heart transplantation, and death. More aggressive treatment strategies may be appropriate for those with increased levels.

During drug treatment, baseline and serial monitoring of sST2 can predict a patient's response to therapy.[13,18] When sST2 levels do not decrease, risk of adverse outcomes is higher.

sST2 levels may also be increased in patients with acute chest pain or dyspnea without heart failure, birch pollen allergies, arterial hypertension, asthma, atherosclerosis, autoimmune disease, cancer, diabetes, infection, inflammation, liver disease, neurological disease, pancreatitis, pregnancy, pulmonary disease, sepsis, and renal disease.[6]

References

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