Carbohydrate Antigen 19-9 (CA 19-9), Serum

Carbohydrate antigen 19-9 (CA 19-9) is a modified Lewis(a) blood group antigen. CA 19-9 may be elevated in patients with gastrointestinal malignancies such as cholangiocarcinoma, pancreatic cancer, or colon cancer. The test is useful For Potentially useful adjunct for diagnosis and monitoring of pancreatic cancer.

May be used for differentiating patients with cholangiocarcinoma and primary sclerosing cholangitis (PSC) from those with PSC alone

**Reference Values**

<55 U/mL

 Serum markers are not specific for malignancy, and values may vary by method.

**Interpretation**

Serial monitoring of CA 19-9 should begin prior to therapy to verify post-therapy decreases in CA 19-9 and to establish a baseline for evaluating possible recurrence. Single values of CA 19-9 are less informative.

 Elevated values may be caused by a variety of malignant and nonmalignant conditions including cholangiocarcinoma, pancreatic cancer, and/or colon cancer.

**Cautions**

* Some individuals do not express CA 19-9. Consequently low values in these individuals are not informative regarding cancer recurrence.
* Do not interpret serum CA 19-9 levels as absolute evidence of the presence or the absence of malignant disease. Use serum CA 19-9 in conjunction with information from the clinical evaluation of thepatient and other diagnostic procedures.
* Some patients who have been exposed to animal antigens, either in the environment or as part of treatment or imaging procedures, may have circulating antianimal antibodies present. These antibodies may interfere with the assay reagents to produce unreliable results.
* In practice, the sensitivity for early cancer is much less. Serum levels are elevated in less than 30% of patients with stage 1 cancers.

Elevated CA 19.9 levels are not specific for pancreatic cancer, but are elevated in other benign and malignant disorders. Other GI malignancies are also associated with elevated CA 19.9 levels, but not usually to the same extent as pancreatic cancer. CA 19.9 is elevated in 67% of bile duct cancers, 41% of gastric cancers, 34% of colon cancers, 22% of esophageal cancers, 49% of hepatomas, and 14% of non-gastrointestinal tract cancers. Most benign disorders cause lower elevations of serum CA 19.9. However, two benign conditions, cirrhosis and acute cholangitis, can cause high CA 19.9 levels. In acute cholangitis, levels rapidly return to normal following decompression of the common duct.

CA 19.9 is the most useful circulating tumor marker for evaluating patients who present with signs and symptoms of a chronic pancreatic disorder. In this population the prevalence of cancer is about 17%. Using an upper limit of normal of 40 U/mL, serum CA 19.9 assays have a sensitivity of 81%, specificity of 90%, and a positive predictive value of 72%. The specificity and positive predictive value for cancer increase with higher CA 19.9 values. The higher the CA 19.9 level, the greater the likelihood of cancer. Levels >300 have a positive predictive value of 92%.

The location of the tumor within the pancreas does not appear to affect sensitivity. Both tumors of the head and the body-tail region cause elevations of similar magnitude. Tumor size is an important determinant of sensitivity. CA 19.9 is elevated in approximately 90% of patients with tumors greater than 3 cm in diameter, but in only 50% of patients with tumors between 2 and 3 cm. Less than 30% of patients with tumors smaller than 2 cm have elevated CA 19.9 levels. Histologic grade also affects CA 19.9 sensitivity. Poorly differentiated tumors do not express CA 19.9 as often as well differentiated tumors.

CA 19.9 can be used in conjunction with CT scan, arteriogram, and endoscopic retrograde cholangio-pancreatography to determine tumor resectability. High levels strongly suggest that the tumor is unresectable. Essentially all patients with CA 19.9 levels above 1000 U/mL have tumors greater than 5 cm in diameter and only 5% of this group have resectable tumors. Half of the patients with pre-treatment CA 19.9 levels below 1000 U/mL have a resectable tumor.

CA 19.9 levels are also useful in predicting survival and recurrence after surgery. Patients with elevated pre-surgical CA 19.9 levels, which normalize after surgery, have a better prognosis than patients whose CA 19.9 levels remain elevated. Progressively rising CA 19.9 levels after surgery predict cancer recurrence several months before CT scan.

Another use for CA 19.9 is to detect cholangiocarcinoma in patients with primary sclerosing cholangitis. CA 19.9 levels are increased in 15% of patients with primary sclerosing cholanitis without cancer and in 90% of patients with cancer. The sensitivity of a CA 19.9 level greater than 100 U/mL for cholangiocarcinoma in primary sclerosing cholangitis was 89% and the specificity was 86%.

Reference range is 0-55 U/mL.

Specimen requirement is one SST tube of blood.

**Specimen Type**

Serum

**Container/Tube:** Plain, red-top tube(s) or serum gel tube(s)

**Specimen Volume:** 0.6 mL of serum

**Reject Due To**

Specimens other than Serum

Hemolysis Mild OK; Gross reject

Lipemia Mild OK; Gross OK

Icteric NA

**Transport Temperature**

Refrig\Frozen OK\Ambient NO